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Jm. Stelmach



ROCKY FLATS

ENVIRONMENTAL RESTORATION

HEALTH AND SAFETY PROGRAM PLAN



JULY 1994

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**ENVIRONMENTAL RESTORATION
HEALTH AND SAFETY PROGRAM PLAN**

REVISION 1

U.S DEPARTMENT OF ENERGY

**Rocky Flats Plant
Golden, Colorado**

ENVIRONMENTAL RESTORATION PROGRAM

July 1994



ENVIRONMENTAL RESTORATION HEALTH AND SAFETY PROGRAM PLAN

APPROVALS

EG&G ROCKY FLATS PLANT

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1

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09/23/94

Organization:

Environmental Restoration Management

APPROVED BY:

Not Applicable

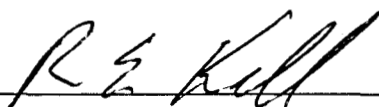
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Director
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Date

9-9-94


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Date

9/2/94


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Date

8/17/94


Health and Safety Liaison Officer

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8-18-94



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LIST OF ACRONYMS

AC	-	Area of Concern
ACGIH	-	American Conference of Governmental Industrial Hygienists
AEDE	-	Annual Effective Dose Equivalent
ALARA	-	As Low As Reasonably Achievable
ALI	-	Annual Limit Intake
ANSI	-	American National Standards Institute
C	-	Celsius
CAER	-	Clean Air Environmental Reporting
CBT	-	Computer-Based Training
CDH	-	Colorado Department of Health
CEDE	-	Committed Effective Dose Equivalent
CFR	-	Code of Federal Regulation
COC	-	Contaminant of Concern
CM	-	Construction Management
CPR	-	Cardiopulmonary Resuscitation
CRT	-	Contractor Technical Representative
CRZ	-	Contamination Reduction Zone
CWA	-	Clean Water Act
DAC	-	Derived Air Concentration
dBA	-	Decibels, A-Scale
DOE	-	Department of Energy
DMR	-	Document Modification Request
DM&RS	-	Data Management & Reporting Services

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E&SSD	-	Engineering & Safety Services Division
EC	-	Emergency Coordinator
EG&G	-	EG&G Rocky Flats, Inc.
EKG	-	Electrocardiogram
EM	-	Environmental Management
EMD	-	Environmental Management Division
EMAD	-	Environmental Monitoring and Assessment Division
EMRE	-	Environmental Management Radiological Engineer
EMT	-	Emergency Medical Technician
EMRG	-	Environmental Management Radiological Guidelines
EOC	-	Emergency Operations Center
EOM	-	Environmental Operations Management
EPA	-	Environmental Protection Agency
EPM	-	Environmental Protection Management
ER	-	Environmental Restoration
ERPD	-	Environmental Restoration Programs Division
ERO	-	Emergency Response Organization
ERHSO	-	Environmental Restoration Health and Safety Officer
EZ	-	Exclusion Zone
FEV/FEC	-	Forced Expiratory Volume / Forced Vital Capacity
FP	-	Fire Protection
FO	-	Field Operations
H&S	-	Health and Safety
HASP	-	Health and Safety Plan
HAZMAT	-	Hazardous Materials Team

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HSLO	-	Health and Safety Liaison Officer
HSP	-	Health and Safety Practic
HSS	-	Health and Safety Specialist
HSST	-	Health and Safety Specialist in Training
HWA	-	Hazardous Waste Area
IAG	-	Interagency Agreement
IC	-	Incident Commander
IDLH	-	Immediately Dangerous to Life and Health
IH	-	Industrial Hygiene
IH&S	-	Industrial Hygiene and Safety
IHSS	-	Individual Hazardous Substance Site
IRA	-	Interim Remedial Action
IWCP	-	Integrated Work Control Program
JSA	-	Job Safety Analysis
LEL	-	Lower Explosive Limit
LFL	-	Lower Explosive Limit
m	-	Meter
MOU	-	Memorandum of Understanding
MSDS	-	Material Safety Data Sheet
NEPA	-	National Environmental Policy Act Division
NIOSH	-	National Institute for Occupational Safety and Health
OM	-	Occupational Medicine
ONC	-	Occurrence Notification Center
OS	-	Occupational Safety
OSHA	-	Occupational Safety and Health Administration

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OU	- Operable Unit
PAC	- Potential Area of Concern
PBT	- Performance-Based Training
PCB	- Polychlorinated Biphenyl
PE	- Project Engineer
PEL	- Permissible Exposure Limit
PM	- Project Manager
PPE	- Personal Protective Equipment
QA	- Quality Assurance
RA	- Remedial Action
RCA	- Radiologically Controlled Area
RCRA	- Resource Conservation and Recovery Act
RCT	- Radiological Control Technician
RD	- Remedial Design
RE	- Radiological Engineering
REL	- Recommended Exposure Limit
RFEDS	- Rocky Flats Environmental Database System
RFI/RI	- RCRA Facility Investigation / Remedial Investigation
RFP	- Rocky Flats Plant
RN	- Registered Nurse
RO	- Radiological Operations
ROI	- Radiological Operating Instruction
RPM	- Remedial Project Management
RWP	- Radiological Work Permit
SARA	- Superfund Amendments and Reauthorization Act

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- SSD - Support Services Division
- SHSC - Site Health and Safety Coordinator
- SOP - Standard Operating Procedure
- SSO - Site Safety Officer
- SZ - Support Zone
- TLV - Threshold Limit Value
- TWA - Time-Weighted Average
- U.S. - United States
- USCG - United States Coast Guard
- WM - Waste Management
- WO - Waste Operations



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Appendix B: Title 29 of the Code of Federal Regulation 1910.120, *Hazardous Waste Operations and Emergency Response*

Appendix C: Site Health and Safety Plan Boilerplate with Instructions for Completion of Boilerplate HASP Tables

(Guidance for the Generation of Site/Task/Project-Specific Health and Safety Plans)

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Environmental Restoration
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APPA	Appendix A: References and Resource Documentation	1	09/23/94
APPB	Appendix B: Title 29 of the Code of Federal Regulation 1910.120, <i>Hazardous Waste Operations and Emergency Response</i>	1	09/23/94
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CHAPTER 1

INTRODUCTION

1.0 Overview

This two part document (the Program Plan and Plan Workbook) is the Environmental Restoration Health and Safety Program Plan for the Environmental Restoration Programs Division (ERPD) Organization's and the Environmental Protection Management (EPM) Directorate's chemical and radiological remediation program at the Rocky Flats Plant (RFP). The purpose of the Program Plan [Part 1] is to provide a framework that identifies the policies, standards, and essential elements of health and safety that are to be addressed when planning and carrying out activities defined under the Interagency Agreement (IAG)¹ and tasks involving hazardous waste operations as part of ERPD activities. The Plan Workbook [Part 2] provides a general discussion of the elements of a health and safety plan and contains a "boilerplate" health and safety plan [Appendix C]. The RFP is owned by the United States (U.S.) Department of Energy (DOE) and operated by EG&G Rocky Flats, Inc. (EG&G).

1.1 Policy

EG&G, in conjunction with DOE, has adopted the federal Occupational Safety and Health Administration's (OSHA) standard for hazardous waste site workers found in Title 29 of the Code of Federal Regulations 1910.120 (29 CFR 1910.120), *Hazardous Waste Operations and Emergency Response*, and other applicable OSHA standards that may apply to hazardous waste site operations. Some sections of 29 CFR 1910.120 are supplemented by more stringent policies and procedures established by EG&G, DOE, and/or other government agencies such as

¹ The Federal Facility Agreement and Consent Order, commonly referred to as the Interagency Agreement (IAG) entered into between the U. S. Department of Energy (DOE), the U. S. Environmental Protection Agency (EPA), and the State of Colorado Department of Health (CDH).

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the U. S. Environmental Protection Agency (EPA) and the State of Colorado Department of Health (CDH). The intent of this written Program Plan is to integrate the performance requirements of governmental agencies with existing Rocky Flats policies and standards, in a manner which best serves the health and safety of workers, visitors, and the surrounding population.

It is EG&G's intention for the Program Plan and the Plan Workbook to establish the foundation from which all "Site/Task/Project-Specific" Health and Safety Plans (Project HASPs) are to be written. EG&G fully understands the need for project-specific flexibility and allows for sound professional judgement in the implementation of this program.

EG&G and its subcontractors are responsible for providing a safe workplace for their employees at any environmental restoration (ER) hazardous waste site. To ensure safe work practices be followed at any ER hazardous waste site, EG&G and its subcontractors are responsible for the preparation of Project HASPs which must incorporate requirements at least as stringent as those presented in this Program Plan.

These Project HASPs may be generated as:

- Subcontractor documents generated for the subcontractor's sole use;
- Subcontractor documents generated to be jointly used by EG&G and the subcontractor;
- EG&G documents generated for the company's sole use; or
- EG&G documents generated to be jointly used by the subcontractor and the company.

The Health and Safety Liaison Officer (HSLO), with technical support from various health and safety support (including Industrial Hygiene, Radiological Protection, Occupational Safety, Occupational Health, and Fire Protection), and the Environmental Restoration Health and Safety Officer (ERHSO) evaluates each Project HASP for consistency with the requirements of regulatory agencies, plant policies, and sound safety and health practices prior to approval and implementation of these plans. All Project HASPs shall clearly define the individuals who must

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comply with the document and must have appropriate approval signatures from the ERHSO, the HSLO, the EG&G ER Project Manager (PM), and respective Subcontractor representative when applicable.

1.2 Application

The Program Plan establishes the minimum acceptable health and safety requirements for all Rocky Flats DOE, EG&G, and subcontract personnel who physically work on any of the ER hazardous waste sites.² Individuals responsible for the development of site-specific plans are encouraged to use this document as a guide to fulfilling the minimum requirements and to locating available Rocky Flats resources. These resources include health and safety professionals, written health and safety procedures, emergency contacts, and existing site characterizations.

This Program Plan has been reviewed by appropriate Health and Safety Departments and approved by the Director of ERPD, the Director of Engineering and Safety Services Division (E&SSD), the Quality Assurance Program Manager, the ERHSO, and the HSLO.

1.3 Programmatic and Regulatory Requirements

The following orders and procedures represent major references which supplement this document. All of these documents are available to ERPD Subcontractors at the ERPD Environmental Resource Center (Library) in Building 080.

Regulatory Requirements:

- DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*;

² Appendix B contains OSHA Regulation 29 CFR 1910.120. Page one of this document describes the regulatory scope and application in detail.

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- DOE Order 5480.1B, *Environmental Safety and Health Program for Department of Energy Operations*;
- DOE Order 5480.4, *Environmental Protection, Safety, and Health Protection Standards*;
- DOE Order 5480.8, *Contractor Occupational Medical Program*;
- DOE Order 5480.9, *Construction Health and Safety Program*;
- DOE Order 5480.10, *Contractor Industrial Hygiene Program*;
- DOE Order 5480.11, *Radiation Protection for Occupational Workers*;
- DOE Order N 5480.6, *Radiological Control Manual*;
- DOE Order 5483.1A, *Occupational Health and Safety Program for DOE Contractor Employees at Government-Owned, Contractor-Operated Facilities*;
- 29 CFR Part 1910, *Occupational Safety and Health Standards*;
- 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response*;
- 29 CFR Part 1926, *Safety and Health Regulations for Construction*; and
- Federal Facility Agreement and Consent Order, commonly referred to as the *Interagency Agreement* (IAG) entered into between DOE, EPA, and CDH.

RFP Policies and Practices:

- *RFP Health and Safety Practices Manual*;
- *RCRA Permitting and Compliance Standard Operating Procedures*;
- *Environmental Management Division Standard Operating Procedures*;
- *Rocky Flats Emergency Plan*;
- *Radiological Operating Instructions Manual*; and
- *Environmental Radiological Monitoring Guidelines*.

1.4 Description of Facility

The RFP occupies 6,550 acres of federally-owned land approximately 16 miles northwest of Denver, Colorado. The production areas are located within a security-fenced area of 384 acres

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[Figure 1-1].

The plant is a DOE facility that produced components for nuclear weapons from plutonium, uranium, beryllium, and stainless steel. Production activities included metal fabrication and assembly chemical recovery and purification of transuranic radionuclides; and related quality control functions. Research and engineering programs in chemistry, physics, materials technology, ecology, nuclear safety, and mechanical engineering support these production activities. Product storage and waste management practices associated with many years of production operations have led to environmental contamination which is being assessed under the direction of ERPD.

1.5 Anticipated Activities and Work Tasks

The Remedial Action Program's (Program) purpose is to investigate and to clean up contaminated DOE facilities. The Program is being implemented in five phases:

- Phase 1 - Installation Assessment includes site inspections and preliminary assessments of potential environmental concerns.
- Phase 2 - Remedial Investigation includes planning and implementing sampling programs to determine the extent of contamination at specific sites and evaluating potential contamination migration pathways.
- Phase 3 - Feasibility Studies are conducted to evaluate remedial alternatives for mitigating environmental concerns identified during the Remedial Investigation.
- Phase 4 - Remedial Design (RD) and Remedial Action (RA) is the final design and implementation of the selected remedial action alternative.

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- Phase 5 - Compliance and Verification is where monitoring and performance assessment programs are implemented to verify and document the adequacy of the remedial actions.

A preliminary program plan for remedial action has been developed by ERPD to investigate numerous sites and determine the need for remediation and appropriate corrective action. These sites are divided into 16 Operable Units (OUs) which are identified in Table 5 of the IAG and on the site maps [Figures 1-1, 1-2, 1-3, 1-4, 1-5, and 1-6]. A preliminary schedule of proposed environmental restoration milestones are presented in Tables 5 and 6 of the IAG.³ Tasks specified in Project Work Plans include assessment and/or closure of spill sites, chemical storage areas, landfills, process equipment, liquid retention ponds, underground storage sites, and reservoirs.

1.6 Summary of Major Contaminants

Raw materials, wastes and end products from operations at RFP, create unique health hazards for the worker conducting environmental restoration activities at the plant. As identified in the IAG, the primary contaminants at the RFP included radioisotopes, metals, and inorganic and organic compounds.

Radioactive isotopes used or generated at the RFP include plutonium, uranium, americium, tritium, and related decay products which can be present in a liquid, solid, or gaseous state. Varying levels of radioactivity are expected at many of the ER sites designated for investigation or cleanup.

Chlorinated organic compounds, including solvents and polychlorinated biphenyls (PCBs), have been used historically in processes or equipment at the RFP. Trichloroethylene and perchloroethylene have been detected in groundwater within the plant boundaries. Other

³ A copy of the IAG is on file in the ERPD Environmental Resource Center (Library), Building 080, for reference to Tables 5 and 6.

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chlorinated organic compounds of concern include 1,1,1-trichloroethane, chloroform, carbon tetrachloride, 1,2-dichloroethane, dichloromethane, and methylene chloride. Non-chlorinated organic compounds, such as acetone, toluene, benzene, methyl ethyl ketone, methyl ethyl ketone peroxide, 2-butanone, xylene, bis(2-ethylhexyl)phthalate, and ethylene glycol, may also be present. Miscellaneous substances listed in the Attachment 4 of the IAG include diesel fuel, fuel oil, peroxides, asbestos, oil sludge, polyester resin, and still bottom sands. Due to the mixture of chemical contamination present, decomposition products may also be found.

A variate of corrosive chemicals have been and are still being used for processing, research, development, and analytical work. Groundwater, surface water, or other liquids collected from the various sites may contain corrosive materials such as sulfuric acid, nitric acid, hydrofluoric acid, sodium hydroxide, and various other nitrate, sulfate, and hydroxide containing compounds.

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CHAPTER 2

ORGANIZATIONAL STRUCTURE

2.1 Responsibilities of Plant Organizations

2.1.1 ERPD Responsibilities

Environmental restoration activities at the RFP are directed by the Director for ERPD [Figure 2-1 and 2-2]⁴ and the Director of EPM. Within ERPD, there are various departments that are involved in restoration and remedial activities. The following outlines a few of the major ERPD departments engaged in environmental restoration activities at RFP.

Operable Unit (OU) Closure Departments

Group 1 Closures (Group 1) directs all environmental restoration and closure activities for OUs 1, 3, 11, 15, and 16. Each OU project is supported by a separate internal organization which provides engineering, reporting, central planning, records retention, early action, and investigation derived materials coordination for that projects needs. This department also contains a support organization to address risk assessments, procurement needs, quality assurance, scheduling, and RFEDS support.

OU 2 Closure (OU 2 Group) directs all environmental restoration closure activities for Operable Unit 2 and entails several organizations such as the characterization team, soil study team, treatability studies and feasibility studies team to address the closure needs of this

⁴ Efforts have been made to include the most current EG&G organizational charts in the Program Plan; however, these organizational charts are subject to change. To obtain more current organizational chart information or to obtain additional charts, contact the Human Resource Programs Department located in Building T130F.

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project. This department also entails a support team to address reporting, central planning and budgeting, records management, procurement, quality assurance, and investigation derived material coordination.

Group 3 Closures (Group 3) directs all environmental restoration closure activities for Operable Units 5, 6, and 7. OU 5 entails organizations to address the assessment and remediation of eleven Individual Hazardous Substance Sites (IHSSs) and two surface disturbance areas located along the WomanCreek Priority Drainage. OU 6 encompasses assessment and potential remediation of nineteen IHSSs in the Walnut Creek Priority Drainage. OU 7 includes the Present Landfill and four IHSSs. OU 7 activities include the characterization of the nature and extent of contamination and risk assessment to arrive at a recommended Remedial Action Plan and to plan, construct and operate remedial facilities. This department also contains a support staff organization to address central planning, subproject coordination, procurement, quality assurance, records management, and RFEDS support needs.

OU 4 Closure (OU 4) directs all environmental restoration closure activities for the solar pond projects program related to OU4. This department is divided into four sub-tier program organizations to include: (1) treatment/storage disposal and sludge remediation, (2) water management, (3) remediation, and (4) project support. The first three sub-tier program organizations are further divided into sub-projects and the fourth sub-tier organization is divided into areas which address regulatory and systems management, subproject baseline management (which includes cost, schedule, and technical baseline management), procedures and technical support, central planning, reporting, quality assurance, and records and document control.

Industrial Area OU Closures (IA OUs) directs environmental restoration closure and accelerated cleanup activities for the RFP industrial area Operable Units which consist of OUs 8, 9, 10, 12, 13, and 14. This department also includes (1) the Special Project which is responsible for decontamination and decommission activities for the Rocky Flats Plant; (2) the industrial area

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interim measure/interim remediation activities for industrial area OU closures; and (3) the environmental restoration science and engineering activities. Additionally, this department includes a support organization to conduct planning, scheduling, reporting, recordkeeping, quality assurance, and procurement functions.

Environmental Restoration Support Departments

Environmental Operations Management (EOM) supports all ER scheduled activities by managing field equipment, operational space allocations, scheduling, and required RFP support. EOM consists of several organizations to include: (1) facility management which oversees decontamination pad operations, technical integration, facility design and construction, OUs 1 and 2 support operations, and building operations; (2) field operations which oversees investigation derived materials management, technical operations, groundwater monitoring, geoscience core activities, and historical release reporting; and (3) environmental restoration health and safety oversight.

Environmental Data Management and Reporting (EDM&R) provides quality support for all ER project activities. The quality support organization provides independent quality assessments of programmatic quality concerns and oversees project management of the internal assessments, self-evaluation, deficiency reporting, corrective action, quality documentation, and cost/productivity improvement functions. The project services organization coordinates the implementation of a comprehensive ERPD-specific training and qualifications program facilitated through a job-task analysis process. The data management organization oversees the quality control, geological information system, Rocky Flats environmental database system, and information resource functions. The environmental documentation organization ensures document control of ER project documents and oversees the maintenance of QA records for the ER project file, administrative records center, and ERPD resource center.

Procurement provides a pertinent service to the ERPD organization. The Environmental

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Services Group of the EG&G Procurement Department provides acquisition support for technical, management, and professional services which in turn support ERPD remedial and project activities.

2.1.2 E&SSD Responsibilities

Health and Safety (H&S) activities at the RFP are under the direction of the Director for Engineering and Safety Services Division (E&SSD) [Figures 2-3] and under the direction of the Director Support Services Division (SSD) [Figure 2-4]. Environmental restoration program activities receive support from the following departments [Figure 2-5]:

- Radiological Operations (RO),
- Radiological Engineering (RE),
- Industrial Hygiene (IH),
- Occupational Safety (OS),
- Occupational Medicine (OM), and
- Fire Protection (FP).

2.1.3 WM Responsibilities

Environmental restoration activities that affect the environment and waste activities at the RFP are directed by the Director for Waste Management (WM) [Figure 2-1]. WM provides the direction and support to establish and maintain the systems and processes for technologies and programs to protect the environment and to manage all wastes generated, treated, and stored at the RFP in accordance with applicable Federal, State, and DOE regulations. These programmatic and line management functions include pollution prevention, waste minimization, waste management, environmental monitoring, technology development, and analytical determinations.

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2.2 Responsibilities of Project Personnel

The Program Plan delineates roles and responsibilities for personnel on ER sites [Figure 2-6]. If line management found an imminent danger hazard and required that operations be stopped, then operations shall not resume until the same level of line management approves resumption. Specific responsibilities for each of the operations and support organizations are described in Health and Safety Practices (HSP) Manual, Procedure 1-62200-HSP-21.03, *Hazardous Waste Operations*. Specific responsibilities for the Division Managers, the Environmental Restoration Health and Safety Officer (ERHSO), the Environmental Management Radiological Engineer (EMRE), the Environmental Restoration Project Manager (PM), the Subcontractor Site Safety Officer (SSO), and the Subcontractor Health and Safety Specialist (HSS) are described below.

2.2.1 Division Managers

ERPD and E&SSD Division Managers are responsible for managing programs and supervising project managers in the implementation of ER and H&S activities. Project management is responsible for the health and safety of personnel throughout an environmental investigation or restoration project site. Personnel health and safety is primarily a line management function. Each line manager is accountable to upper management for carrying out assigned work in a safe manner, protecting personnel from potential risks, and providing personnel with a healthy and safe environment as proscribed by the Project HASP.

2.2.2 Environmental Restoration Project Managers

The ER Project Manager (PM) is the direct line supervisor responsible for project work on a designated ER site. The PM has overall control and responsibility for the management of the project, including implementation of health and safety requirements at the project site. The PM is the single-point-of-contact for implementing ER's needs and requirements through the

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Subcontract Administrator to subcontractors. Some specific responsibilities of the PM are as follows:

- Ensures that the project is performed in a manner consistent with the Project HASP;
- Provides the Site Safety Officer (SSO) with the project information needed to develop health and safety plans;
- Ensures that the project HASPs are prepared and approved and properly implemented in a timely manner;
- Ensures that adequate funds are allocated to fully implement Project HASPs;
- Ensures compliance with Project HASPs of subcontractor personnel;
- Ensures implementation of the Project Hazard Communications Program;
- Coordinates with the SSO on health and safety matters;
- Informs subcontractors of EG&G health and safety requirements;
- Assigns an approved SSO to the project and, if necessary, assigns a suitably qualified replacement; and
- Stops work based upon imminent hazards and hazardous conditions. This duty may be one which temporarily suspends field activities, if the health and safety of personnel is endangered, pending an evaluation and approval for resumption of work by the SSO.

2.2.3 Environmental Restoration Health and Safety Officer

The Environmental Restoration Health and Safety Officer (ERHSO) is responsible for managing and implementing the Program Plan. ERPD is responsible for project planning, contracting, and managing ER projects. Therefore, the ERHSO:

- Ensures Project HASPs are written for each project (OU) and are implemented to adequately address applicable regulatory requirements, industry standards, and RFP policies and practices;
- Ensures that subcontractors prepare Project HASPs;

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- Reviews and evaluates health and safety data;
- Ensures final disposition of comments are incorporated into Project HASPs.
- Coordinates review of Project HASPs as required for ERPD activities with the HSLO;
- Performs review and approval of Project HASP field changes;
- Provides support to PMs in the area of environmental health and safety through his/her expertise and that of the environmental support divisions;
- Ensures information presented in the Project HASP meets the requirements of 29 CFR 1910.120 and is correct and comprehensive in identifying site hazards and their means of control; and
- Stops work based upon imminent hazards and hazardous conditions. This duty may be one which temporarily suspends field activities, if the health and safety of personnel is endangered, pending an evaluation and approval for resumption of work by the SSO.

2.2.4 Health & Safety Liaison Officer

The Health and Safety Liaison Officer (HSLO) is assigned from IH to ERPD to serve as the central point-of-contact for supporting the Program Plan for all operational health and safety needs.

The HSLO reports to the IH Manager and interacts directly with the PMs and the ERHSO. In addition, the HSLO has the following responsibilities:

- Coordinates health and safety activities with the ERHSO and the PMs;
- Supervises the EG&G Site Health and Safety Coordinators (SHSCs) at each ER site (OUs and hazardous waste areas);
- Coordinates quarterly health and safety audits and inspections of health and safety programs and program documentation for subcontractors for hazardous waste operations;
- Performs formal audits of EG&G Hazardous Waste Operations training courses on an annual basis (The purpose of these audits is to ensure compliance with OSHA requirements for hazardous waste operations training.);

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- Coordinates review and approval of Project HASP field changes with the ERHSO; and
- Stops work based upon imminent hazards and hazardous conditions. This duty may be one which temporarily suspends field activities, if the health and safety of personnel is endangered, pending an evaluation and approval for resumption of work by the SSO.

2.2.5 Site Safety Officer

The Site Safety Officer (SSO) will be appointed by the PM with the approval of the ERHSO. The SSO's responsibilities are as follows:

- Directs health and safety activities on-site;
- Reports immediately all safety-related incidents or accidents to the ERHSO, the SHSC, and the PM;
- Assists PMs in all aspects of implementing Project HASPs;
- Maintains health and safety equipment on-site;
- Implements emergency procedures as required;
- Approves personnel to work in the field;
- Stops work based upon imminent hazards and hazardous conditions. This duty may be one which temporarily suspends field activities, if health and safety of personnel is endangered, pending further consideration and approval for resumption of work by the SHSC;
- Temporarily suspends an individual from field activities for infractions of the Project HASP, pending further consideration and approval for resumption of work from the SHSC; and
- Verifies personnel medical qualifications and training.

2.2.6 Site Health and Safety Coordinator

A Site Health and Safety Coordinator (SHSC) will be assigned from IH by the HSLO to oversee

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programmatic support for each ER project. The SHSC will report to the HSLO and will keep the PM informed of health and safety related activities on the site. In addition to the responsibilities identified in Procedure 1-62200-HSP-21.03, *Hazardous Waste Operations*, the SHSC's responsibilities include the following:

- Evaluates EG&G and subcontractor work to verify compliance with the requirements of Project HASPs;
- Evaluates health and safety data collected at ER project sites;
- Performs inspections for proper and appropriate use of personal protective equipment (PPE), monitoring and decontamination procedures, site control, and all required documentation;
- Alerts the PM, HSLO, and the ERHSO of health and safety violations at the ER project site (OU); and
- Provides health and safety support for EG&G employees.

2.2.7 Health and Safety Specialist

The Health and Safety Specialist (HSS) must be approved by the RE and IH Departments. The HSS shall assist the Site Safety Officer (SSO) in implementing the Project HASPs and be present (in the immediate vicinity) during all activities involving potential exposure to hazardous waste. None of these activities shall be permitted in the absence of the HSS.

The HSS has the authority to stop work in case of an imminent safety hazard or potentially dangerous situation. After stopping work, the HSS shall immediately consult the SSO. The HSS must obtain countersignatures from the SSO on all survey reports. In addition, the HSS has the following responsibilities:

- Ensures that each individual within his/her jurisdiction complies with the provision of the Project HASP;

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- Implements the *Environmental Management Radiological Guidelines* (EMRG);
- Provides on-site air monitoring during field activities;
- Conducts radiological surveys and documents the results;
- Communicates with the command post for on-site activities;
- Supervises decontamination, monitors workers for heat or cold stress, and distributes health and safety equipment;
- Documents safety practices;
- Initiates appropriate emergency procedures;
- Forwards completed survey reports and/or forms to the SSO;
- Notifies the SSO of survey results that indicate radiation levels exceeding 5 mrem/h, levels requiring access controls not already established, or levels exceeding an established action level;
- Controls access and advises all personnel when radiological precautions are required;
- And completes performance and operational checks required for radiation instruments and makes entries in the *Instrument Field Log Book*.

2.2.8 Contractor Technical Representative

The Contractor Technical Representative (CTR) oversees all aspects in the completion and compliance of the subcontract. The CTR's responsibilities are as follows:

- Maintains the authorities to rectify concerns related to compliance and procurement issues of contractor and subcontractor; and
- Performs additional responsibilities defined by Procurement policy and contractual agreements with the subcontractor.

2.2.9 Radiological Control Technician

- Conducts necessary operation checks on radiation monitoring equipment;

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- Conducts radiation monitoring and checks action levels for radiological contamination defined in the HASP;
- Ensures that Radiological Protection practices conform with Radiological Operating Instructions (ROIs);
- Notifies supervision when action levels are approached or reached;
- Performs personnel monitoring and equipment surveys prior to leaving Radiologically Controlled Areas (RCAs) within OUs and HWAs and documents all survey results; and
- Provides Radiological Work Permits (RWPs) for RCAs.

2.2.10 Radiological Engineering

- Anticipates, recognizes, and evaluates radiological health hazards, and recommends control measures as necessary (engineering controls shall be emphasized);
- Performs regular inspections of OUs and HWAs to determine compliance with HASPs;
- Ensures, in conjunction with IH and ERPD, that site characterization and analysis, in accordance with 29 CFR 1910.120, is performed to identify specific site radiological hazards at OUs and to determine if the necessary safety and health control procedures to protect personnel from the identified hazards;
- Ensures, in conjunction with IH and ERPD, that appropriate site control procedures are implemented before cleanup work begins to control personnel exposure to radiological hazards;
- Provides technical review of all HASPs, JSAs, IWCPs, and procedures as necessary; and
- Implements radiological protection programs.

2.2.11 Industrial Hygiene

- Anticipates, recognizes, and evaluates non-radiological health hazards, and recommends control measures as necessary (engineering controls shall be emphasized, rather than administrative or PPE controls);

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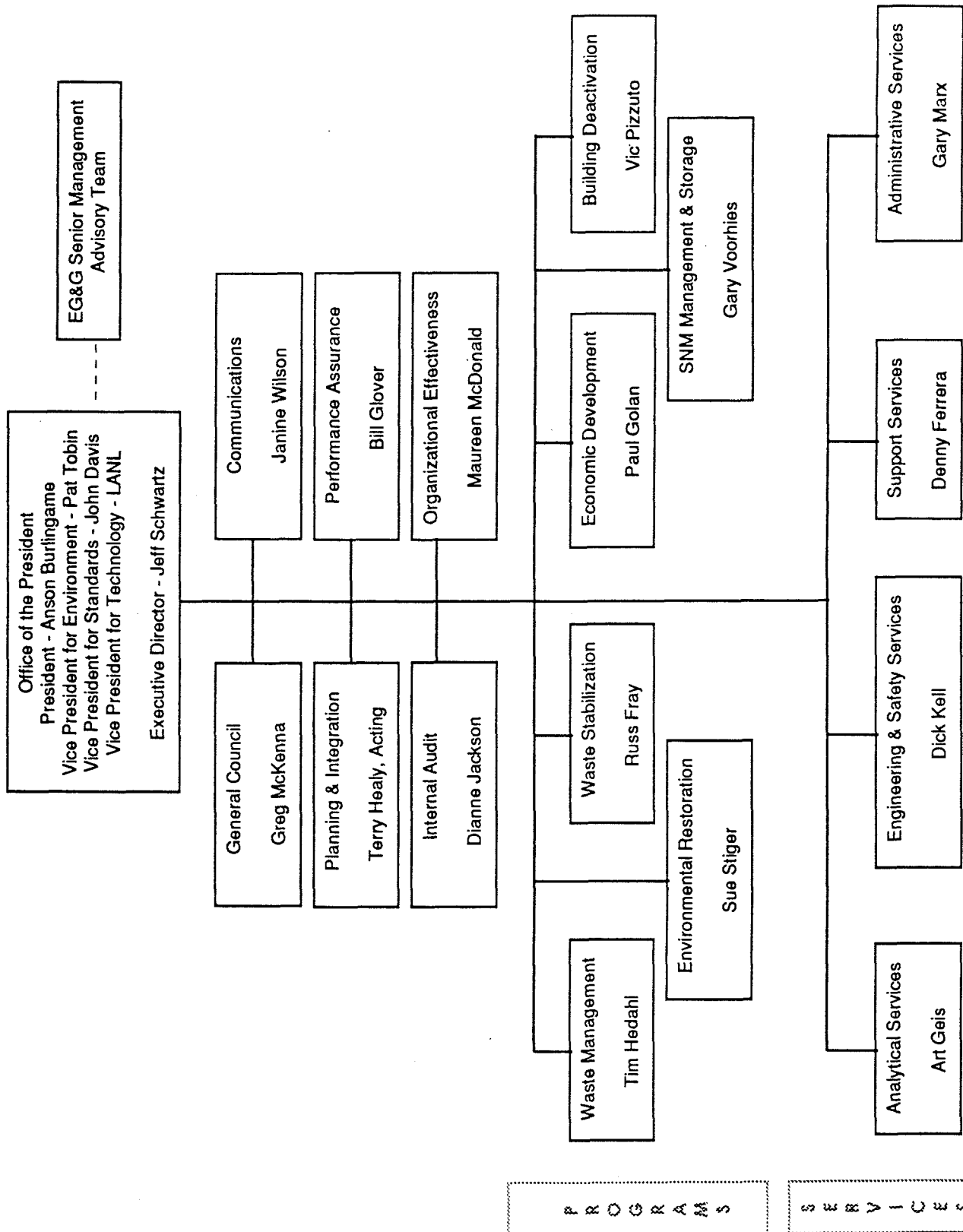
- Performs regular inspections of OUs and HWAs to determine compliance with the HASP;
- Ensures, in conjunction with the ERPD and RE that site characterization and analysis, in accordance with 29 CFR 1910.120, is performed to identify specific site health hazards at OUs, and to determine the necessary safety and health control procedures to protect personnel from identified hazards;
- Ensures, in conjunction with the ERPD and RE, that appropriate site control procedures for OUs are implemented before cleanup work begins, to control personnel exposure to hazardous substances;
- Ensures, in conjunction with the Waste Operations (WO), Waste Programs (WP), EM, RE, and OS Departments, that specific site health hazards at OUs and HWAs are identified, and to determine necessary safety and health control procedures to protect personnel from the identified hazards;
- Provides a Subject-Matter Expert (SME) for technical input to all plant training applicable to 29 CFR 1910.120;
- Provides technical reviews of all HASPs, JSAs, IWCP documents, and procedures, as necessary; and
- Provides the HSLO and SHSC for OUs and HWAs.

2.2.12 Site Personnel

- Adheres to the requirements of the HASP;
- Actively participates in the field implementation of the HASP; and
- Responds to emergency situations by evacuating the ER site, notifying the PM or activating the emergency response number (966-2911) in emergency situations, and securing the ER site until emergency responders arrive.

Figure 2-1

EG&G ROCKY FLATS, INC.



ENVIRONMENTAL RESTORATION PROGRAMS DIVISION

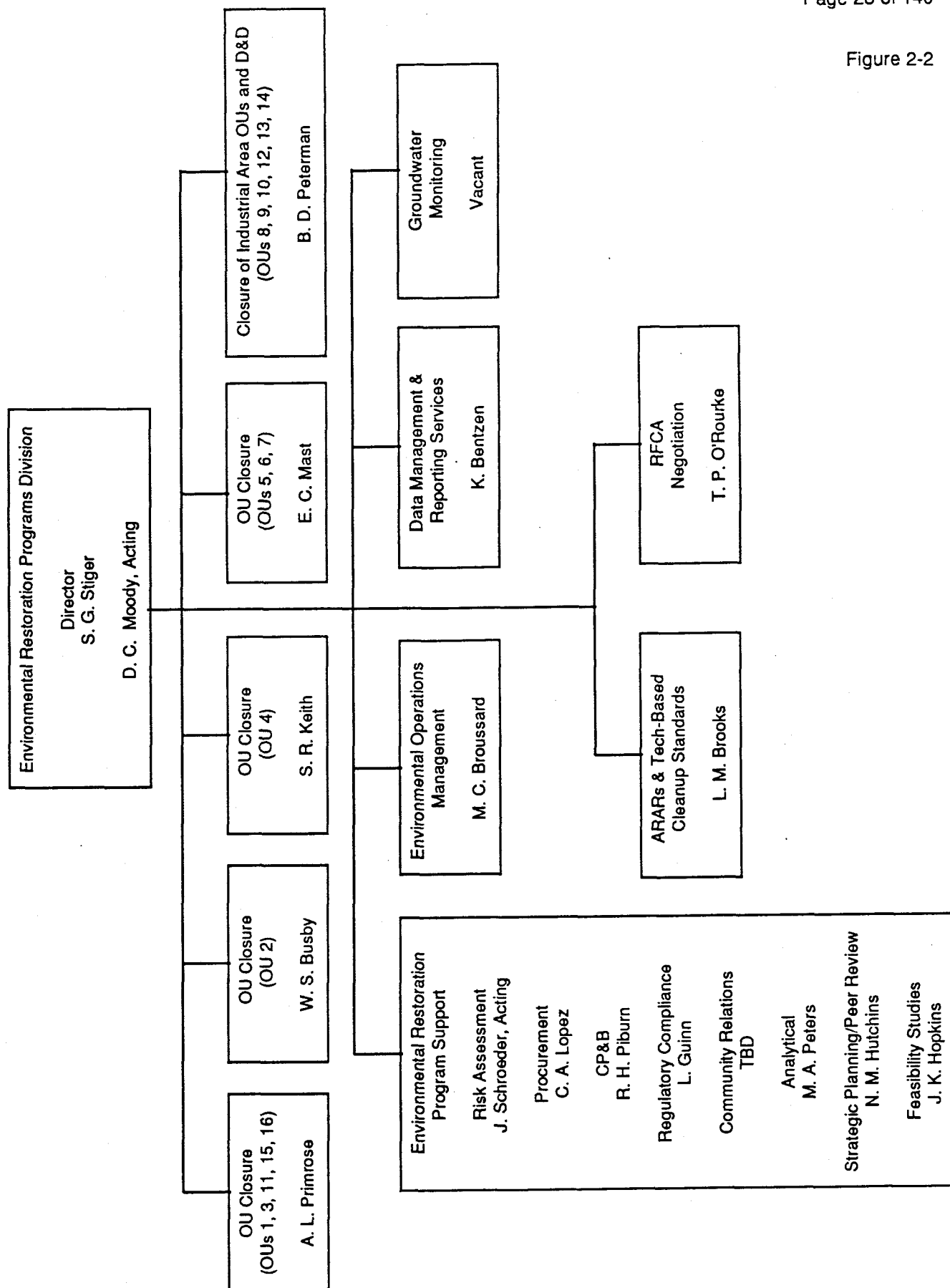


Figure 2-2

Figure 2-3

ENGINEERING & SAFETY SERVICES DIVISION

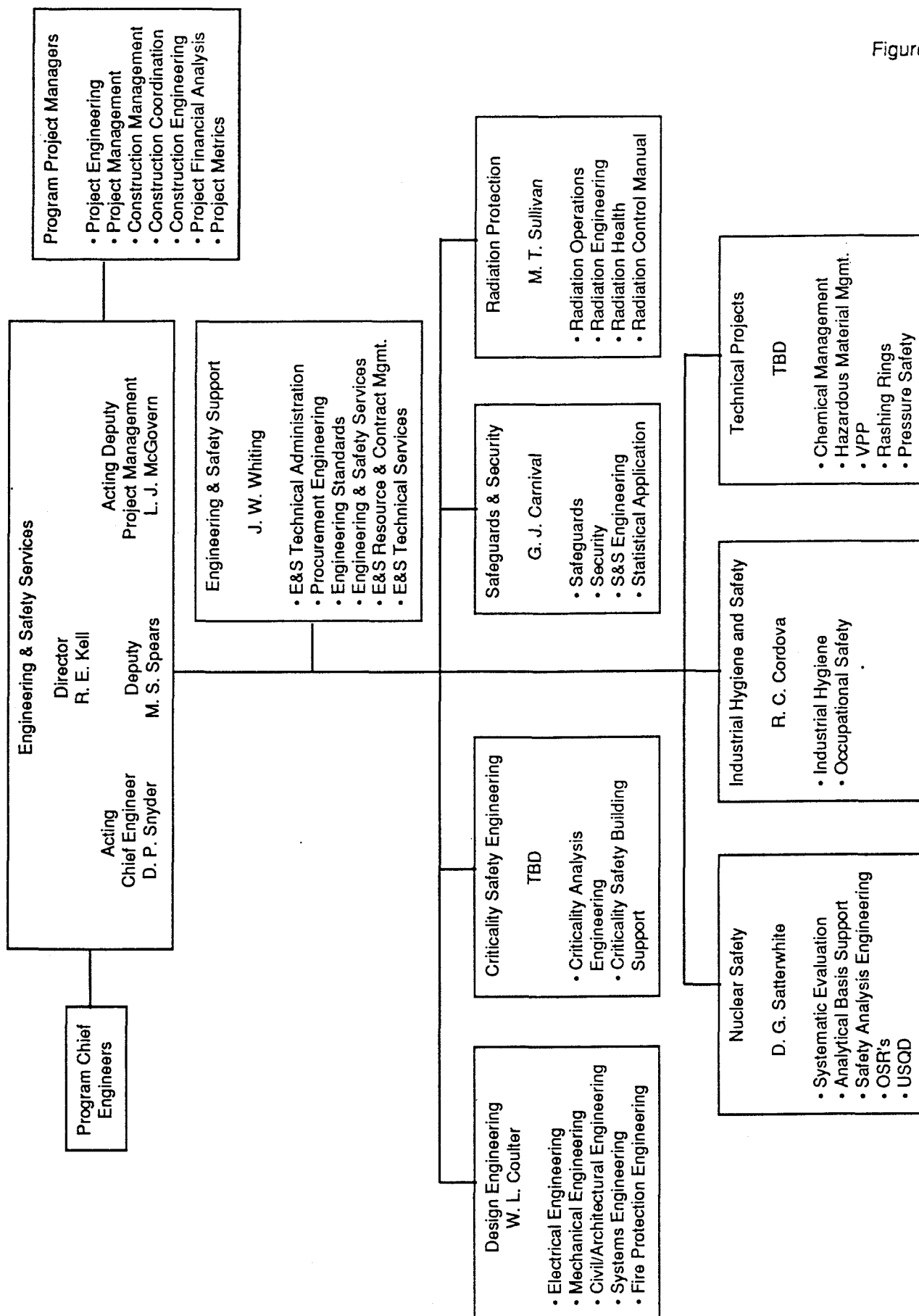


Figure 2-4

SUPPORT SERVICES DIVISION

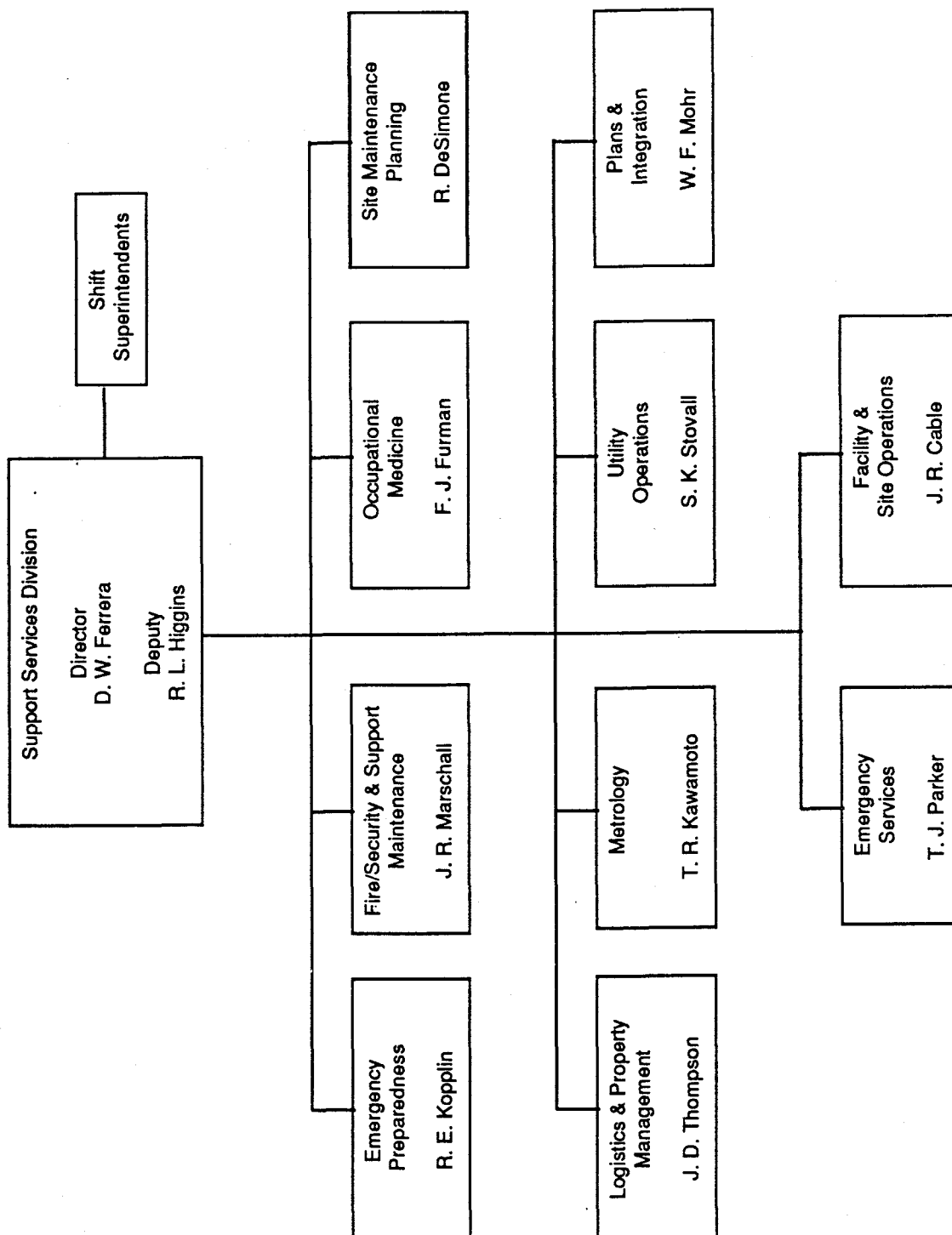


Figure 2-5

EXAMPLE ERP PROJECT ORGANIZATION CHART

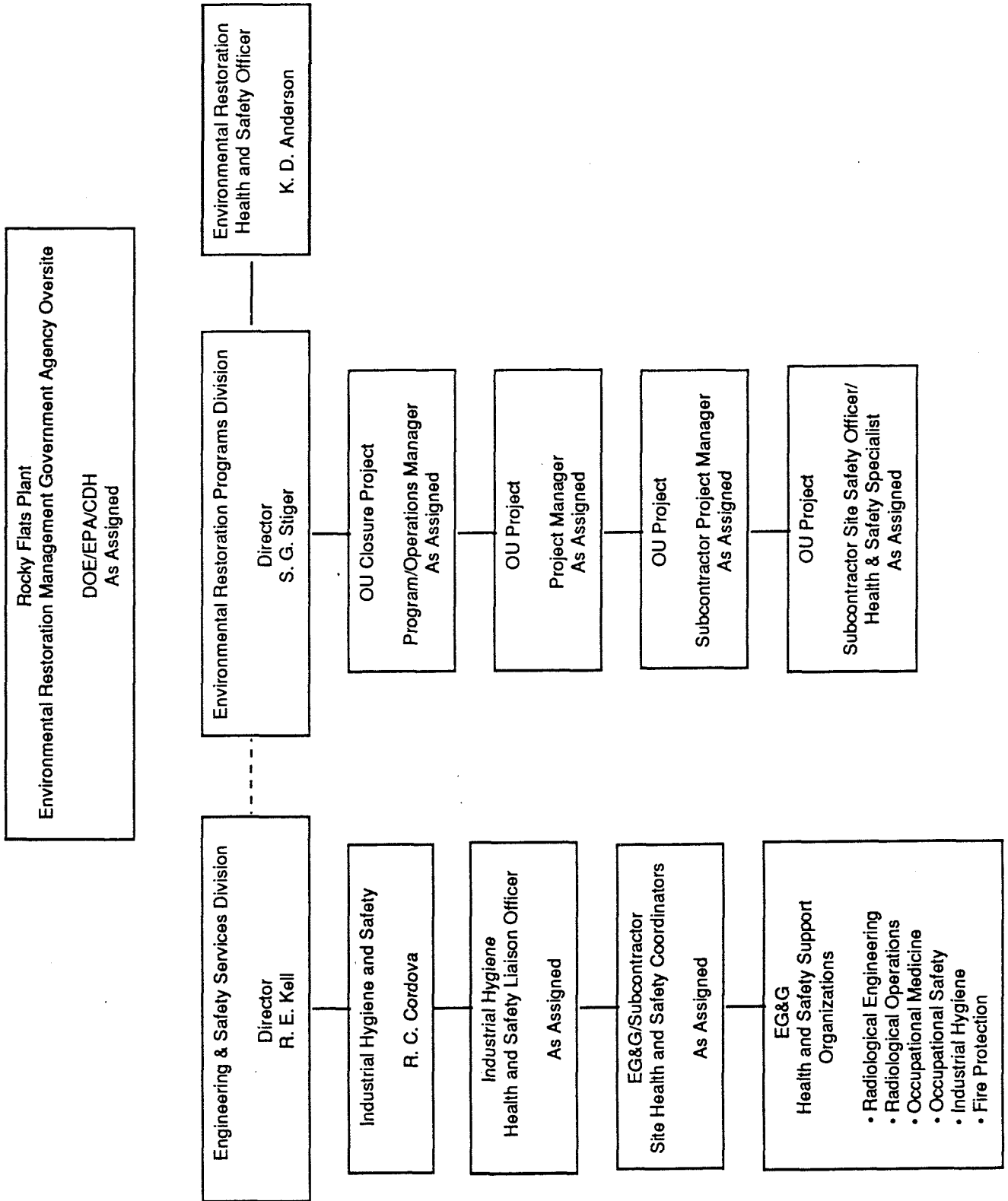
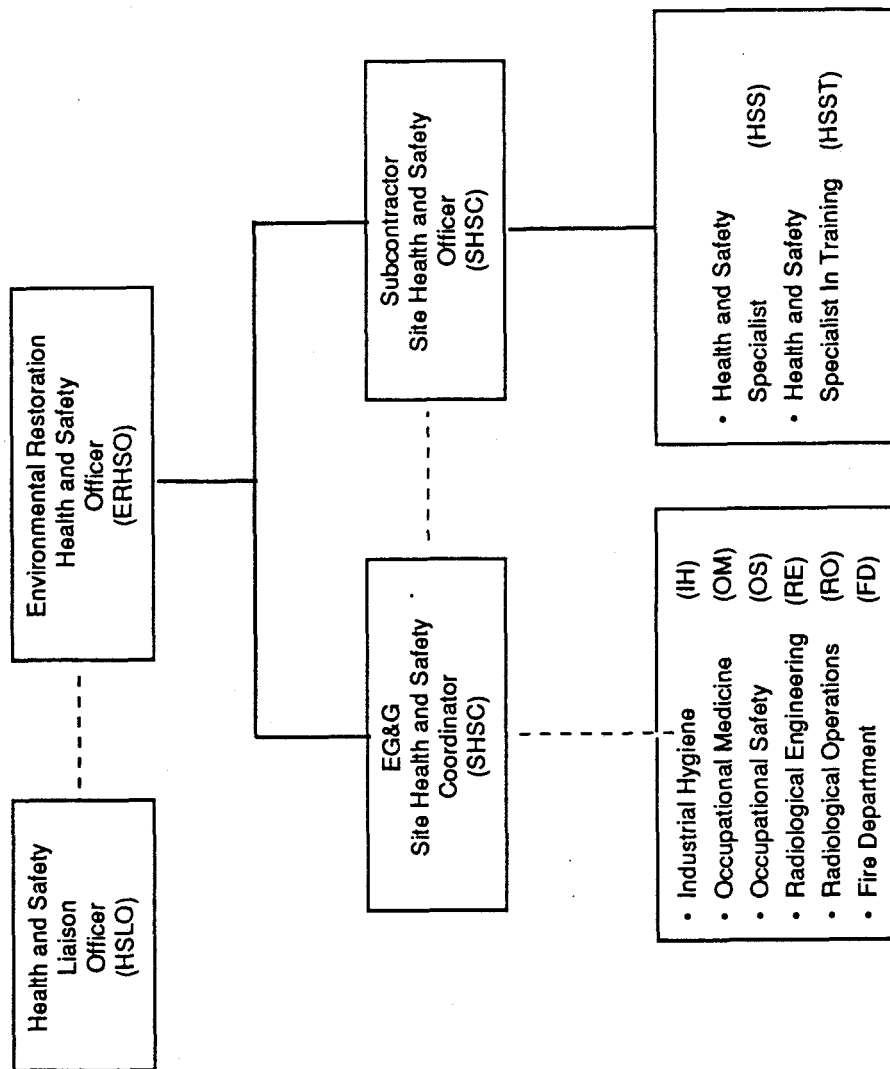


Figure 2-6

RELATIONSHIP BETWEEN PROJECT PERSONNEL



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CHAPTER 3

PROJECT HEALTH AND SAFETY PLANS

3.0 Overview

This chapter describes material that is to be incorporated into each Project HASP (subsequently referred to as the HASP) and explains how the HASP is to be used. Section 3.1 describes the application of a HASP. Section 3.2 presents a detailed listing of necessary components of the HASP. Section 3.3 describes the procedures to be followed for conducting program audits. Section 3.4 describes the review and approval process for HASPs.

A Plan Workbook has been prepared to aid EG&G and Subcontractor personnel in developing their plans (see Part 2 of this document). Although every attempt has been made to include the descriptions and procedures required for each situation encountered in the field, circumstances will undoubtedly arise that are not covered in the Plan Workbook. The Plan Workbook is a guide that subcontractors may use to prepare HASPs.

3.1 Application

A HASP is required for each project that falls under the scope of the OSHA regulations for hazardous waste sites as stated in 29 CFR 1910.120 (a)(1). At RFP, such sites are identified under the IAG. HASPs must be developed, address the tasks being performed, and meet the requirements of 29 CFR 1910.120. All resource information discussed in this Program Plan will be provided (by EG&G) to subcontractors to assist them in preparing their HASPs (see Appendix B). Once approved by EG&G and other approving authorities such as DOE, the elements of the HASP shall direct the health and safety activities of all workers and visitors falling within its scope.

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3.2 Health & Safety Plan Components

As a minimum, the following components shall be addressed in HASPs. Specific items are obtained from Procedure 1-62200-HSP-21.03, *Hazardous Waste Operations*.

- Safety and health hazard assessment;
- Description of hazardous substances or health hazards expected at the site;
- Chemical/physical/radiological properties of identified hazards;
- Risk associated with identified hazardous substances;
- Safety and health risk analysis for each site task and operation;
- Key personnel responsibilities and assignments;
- Training regulations for personnel;
- Specified personal protective equipment by task;
- Medical surveillance requirements;
- Site control measures;
- Calibration and performance check requirements;
- Personnel and site monitoring requirements;
- Action levels for upgrading/downgrading personal protective equipment;
- Specific survey/monitoring instruments for each contaminant of concern;
- Decontamination requirements and techniques;
- Emergency response plans;
- Confined space entry procedures, if applicable;
- Spill containment contingencies;
- Background of the project including scope of work, site history, anticipated duration of work, worker classifications, government agency involvement, and approval documentation;
- Site maps; and
- Description of tasks to be performed.

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The required elements of the HASP are described in greater detail in the Plan Workbook. Plans deficient in one or more of these elements will not be approved by EG&G.

Additional elements that will be incorporated into HASPs, when appropriate, are:

- Engineering controls;
- Safe work practices;
- Handling of drums and waste containers;
- Site illumination;
- Sanitation at temporary work places;
- Construction safety requirements; and
- Safe handling of radioactive materials and environmental samples.

Subcontractors may also be required to provide Job Safety Analyses (JSAs) for tasks not covered by existing EG&G procedures. A JSA is a safety analysis of a specific task not previously or routinely done. A representative of the OS Department will review the need for JSA development during the Work Plan review. Once developed, the JSA will need to be approved according to Procedure HSP-2.11, *Job Safety Analysis* and will become an auditable part of the Project Work Plan. Instructions for the development of a JSA are provided in the referenced procedure.

Standard Operating Procedures (SOPs) have been prepared for the activities conducted as part of environmental remediation. These SOPs are found in the *Environmental Management Division Operation Procedures*, Volume I through V:

- Volume I: *Field Operations*;
- Volume II: *Groundwater*;
- Volume III: *Geotechnical*;
- Volume IV: *Surface Water*; and

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- Volume V: *Ecology*.

Additional guidance documents for ER activities are the:

- *Environmental Management Radiological Guidelines*, Manual No. 3-21000-OPS-EMRG; and
- *Environmental Management Administrative Procedures*, Manual No. 2-11000-ER-ADM.

NOTE: Subcontractors are required to follow all applicable ER SOPs.

3.3 Review and Approval

All HASPs must meet the requirements of OSHA standard 29 CFR 1910.120, DOE orders, and RFP standards and policies. Subcontractors will also be held accountable for any additional health and safety requirements identified in their contract. The ERHSO shall coordinate the plan approval process with the appropriate E&SSD Departments and ERPD.

3.3.1 Health & Safety Plan Review

The EG&G PM or Subcontractor (i.e., the Generator) is required to submit a HASP to the ERHSO three weeks prior to the initiation of field work. Eight copies, marked as the "DRAFT," must be submitted. The scope of the project will dictate which departments will need to review the HASP. Reviewing Departments will include RE, RO, IH, OS, OM, and FP. Additional departments may be required to review the HASP depending upon the scope.

The ERHSO will distribute the HASP with a Review Comment Sheet [Figure 3-1] to the appropriate reviewing departments in accordance with Procedure 2-E02-ER-ADM-05.05, *Document Review*. Other divisions may be required to review the HASP when appropriate. Reviewers will have five working days to identify deficiencies in the HASP. If comments are not

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received within the allotted period of time for review, it will be assumed that concurrence has been granted. Reviewers may notify the ERHSO if additional review time is required. The ERHSO will consolidate comments and return the HASP to the Generator for disposition and resolution. The Generator will have one week to respond and submit the revised HASP along with documented comment disposition. The revised HASP will then be resubmitted to Reviewers.

Once satisfied with the corrections, the representative of the reviewing department will sign off on the HASP to document that they have reviewed the HASP and agree that the requirements which are managed by the reviewing department have been addressed in a technically correct manner [Figure 3-2]. The ERHSO and the HSLO will review the changes for completeness and may resubmit the HASP to the appropriate department(s) for additional review if necessary.

Final EG&G approval of the HASP will be provided by the ERHSO, the HSLO, and the PM [Figure 3-3]. The PM will then submit a final copy of the HASP with accompanying historical files to ERPD Document Control in accordance with Procedure 2-G01-ER-ADM-06.01, *ERM Document Control*.

Any changes in the scope of work of an established HASP shall be updated in accordance with the requirements of the Program Plan and with procedural requirements of the ERPD EDM&R Department. Anyone can initiate a change in the HASP by filling out the *HASP Field Change Form* [Appendix C, Section 1.6] and submitting this form to the ERHSO. The ERHSO will review the change and submit to the affected health and safety disciplines as needed for concurrence. The ERHSO will obtain final approval from the PM and the HSLO.

Once interim approval is obtained by signatures of the ERHSO, the PM, and the HSLO, the *Field Change Form* will be submitted to the ERPD EDM&R Department to be annotated on a *Document Modification Request (DMR) Form* in accordance with Procedure 2-E04-ER-ADM-05.07, *Preparation of Document Modification Requests*. The DMR must be submitted to and issued by the ERPD Document Control Center for distribution document changes to controlled copy holders

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in accordance with Procedure 2-G01-ER-ADM-06.01, *ERM Document Control*.

3.4 Program Inspections

All HASPs implemented at RFP are subject to inspection by EG&G, DOE, EPA, CDH, and other agencies with regulatory authority over the site. Such inspections may include, but are not limited to, the items described in Figure 3-4. The intent of the inspection process is to verify the implementation of the HASP and to evaluate its effectiveness in protecting the health and safety of workers, visitors, and the surrounding population. The SHSC will evaluate the effectiveness of the HASP on a regular basis as per Procedure 1-62200-HSP-21.03, Section 4-2-9-1, *SHSC Duties*.

The ERHSO, along with the HSLO or the SHSC, will ensure that appropriate health and safety support groups (i.e., RE, OS, etc.) participate in site inspections. Any necessary corrections that need to be made shall be documented and implemented through the authority of the PM and CTR. Corrective action and activity reports will be kept in a site journal and summary reports will be provided to the ERHSO and the HSLO. The ERHSO and the HSLO, with the concurrence of the PM, will ensure that independent and unannounced inspections of the HASP are conducted to verify site and worker compliance with the plan and all applicable regulations.

Figure 3-1

REVIEW COMMENT SHEET

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Please review the attached procedure: _____				Number _____	Rev. _____	Draft _____	Title _____
Comment Due Date: _____							
<input type="checkbox"/> Internal Review <input type="checkbox"/> Parallel Review <input type="checkbox"/> Verification <input type="checkbox"/> Validation <input type="checkbox"/> Revalidation							
General (G) comments require resolution but do not require resolution acceptance. Mandatory (M) comments require resolution <u>and</u> resolution acceptance. 1-88000-PP-004 provides complete definitions of General and Mandatory comments.							
ITEM G or M	PAGE	SECTION OR STEP	COMMENT	RESOLUTION	Resolution accepted INIT/DATE		

POC/Reviewer: (Comments not signed by Reviewer/POC will be considered unofficial and not subject to resolution)

☐ No Comments

☐ This procedure revision has no impact or relevance to our discipline or organization and we waive need to concur. We acknowledge this concurrence waiver does not affect our responsibility to implement the requirements of this procedure when needed.

Name _____ Signature _____

Ext./Pager/Fax _____ Bldg./Dept./AGM _____ Date _____

Return to:

FAX _____ Name _____ Ext. _____ Location _____

If questions on content, please call the SME:

Name _____ Ext. _____

NOTE: These reviews will be completed by qualified reviewers in accordance with 1-88000-PP-004 in concert with 1-88000-PP-001 and 1-88000-PP-003.

DEPARTMENTAL REVIEW AND APPROVAL OF THE PROJECT HEALTH AND SAFETY PLAN

The following signature documents that this Department of EG&G Rocky Flats, Inc. has reviewed the Project Health and Safety Plan (HASP) and agrees that applicable federal, state, and local regulations and RFP policies and practices, as implemented by the signing Department, have been incorporated.

Health and Safety Plan Title:

Project HASP (Accident Prevention and Safety Program) Rocky Flats Plant

Occupational Safety

Date

Industrial Hygiene

Date

Radiological Engineering

Date

Radiological Operations

Date

Occupational Medicine

Date

Fire Protection

Date

FINAL REVIEW AND APPROVAL OF THE PROJECT HEALTH AND SAFETY PLAN

The Project Health and Safety Plan (HASP) has been written for the use of personnel associated with the environmental restoration site/task project. All personnel will comply with all aspects of this plan as it relates to health, safety, and emergency response.

Health and Safety Plan Title:

Project HASP (Accident Prevention and Safety Program) Rocky Flats Plant prepared by
Subcontractor/EG&G

EG&G Project Manager

Date

Health and Safety Liaison Officer

Date

Environmental Restoration Health and Safety Officer

Date

Industrial Hygiene Environmental Contractor Compliance Assessment Form

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Part One: Records Review

Contractor:

Auditor(s):

Name, Group

OU:

Date:

General Documents

Site Specific Health & Safety Plan ☐yes ☐noLast Update / /

OSHA 200 Form

☐yes ☐no

Instrument Calibration:

(random 2 instruments)

Make/Model/Unit#

Date Calibrated

At random, pull files for two (2) onsite field employees. One employee should be a field supervisor. Enter most current date. Enter "N/A" if not applicable.

	Field Employee	Field Supervisor
Name, SSN:		
Document	Date Completed	Date Completed
Health & Safety Plan Sign-off		
Site Safety Briefing		
Tailgate Safety (min. frequency <u> </u>)		
Training Records		
General Hazard Communication Training		
Respirator Training		
Respirator Fit-test		
Radiological Safety Training (One Day)		
OSHA 40-Hour Training		
OSHA 3-Day Field Experience (for 40-Hour)		
OSHA 8-Hour Refresher Training		
OSHA 8-Hour Supervisor Training		
Medical Records		
General Physical (respirator use authorization)		
Exposure Monitoring (<i>see Field Inspection</i>)		
Are exposure monitoring records retrievable for each employee <input type="checkbox"/> yes <input type="checkbox"/> no		

Site Safety Officer

Print Name

Signature

Auditor

(EG&G, IH Representative)

Print Name (1)

Signature(1)

RF-47929 (4/93)

Print Name(2)

Signature(2)

Industrial Hygiene Environmental Contractor Compliance Assessment Form

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Part Two: Field Inspection

Site Location/IHSS:

Site Safety Officer (SSO):

Present Activity:

Do the following conform with SSHSP?

Site Control ☐yes ☐no

Briefly describe method (cones, tape, etc)

Decontamination ☐yes ☐no

Briefly describe method (solutions, equip, etc)

Communication ☐yes ☐no

Briefly describe method (radio, telephone, etc)

Personal Pro. Equip. ☐yes ☐no

Briefly describe materials and types

Respiratory Protection ☐yes ☐no

Briefly describe type & filter (if applicable)

Exposure Monitoring ☐yes ☐no

Briefly describe method

Hazard: _____

Hazard: _____

Hazard: _____

If not, or if SSO discretion exercised, describe:

Instrument: _____

Instrument: _____

Instrument: _____

Site Safety Officer
(SSO)

Print Name _____

Signature _____

Auditor(s)
(EG&G, IH Representative)

Print Name (1) _____

Signature (1) _____

Print Name(2) _____

Signature(2) _____

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CHAPTER 4

TRAINING

4.0 Introduction

The purpose of the health and safety training program is to provide the knowledge and skills needed to safely perform required tasks in potentially hazardous environments; utilize protective equipment to prevent exposures or injury; and to anticipate, identify, and respond appropriately to unplanned or potentially dangerous situations. The training requirements established for workers at RFP vary based on the classification of the site, the workers' assigned tasks, the respiratory protection requirements for the project, and the workers' job classification.

Section 4.1 describes the training requirements and course content for anticipated operations. Section 4.2 addresses the criteria for approved courses and methods of obtaining training. Section 4.3 describes EG&G methods of evaluating trainees' performance. Section 4.4 describes verification of worker training, and Section 4.5 addresses documentation.

4.1 Training Requirements

4.1.1 Initial Hazardous Waste Site Health and Safety Training

In accordance with 29 CFR 1910.120 (e)(3)(i-iv), any individual who is assigned to work within a hazardous waste site, as defined by the scope of this document, must first complete a hazardous waste health and safety course. RFP implementation of the training requirement is detailed in Procedure 1-62200-HSP-21.03, *Hazardous Waste Operations*. The requirements for 24- and 40-hour Hazardous Waste Operations and Emergency Response training are clearly defined in HSP 21.03 and are to be referenced for appropriate training based upon hazardous

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waste activities.

Supervisors of hazardous waste sites or of tasks conducted on hazardous waste sites must have, as a minimum, the same baseline training (24 or 40 hours) as those workers being supervised plus an 8-hour advanced supervisor health and safety course. In addition, all hazardous waste workers must receive an 8-hour refresher course annually. Workers will not be permitted on site if training is not current. The IH Department should be contacted for clarification of the level of training required of workers for specific projects.

A current outline of the major subjects covered in the EG&G 24- and 40-hour *Hazardous Waste Operations and Emergency Response* training may be obtained from the Performance-Based Training (PBT) organization. Certification of training not provided by EG&G must be submitted to the PBT Department for approval. The two courses are identical except that the 24-hour course does not include field exercises. The refresher course is an in-depth review of the initial training course material.

4.1.2 Radiation Worker Training

Specific guidance on training requirements for Radiation Worker Training is detailed in Procedure HSP-18.02, *Personnel Contamination Control Requirements for Radiologically Controlled Areas*. Workers who are assigned to perform activities in areas where radioactive materials are known to exist or suspected to exist will be required to take one of the two courses. Decision criteria is based upon the following:

- Individuals -- who do intrusive⁵ (as defined in Procedure 1-B37-HSP-12.08, *Excavations and Trenching*) work in Radiologically Controlled Areas (RCAs) or an area of

⁵ Intrusive activities are "any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal." Intrusive activities may include staking, soil sampling, or some types of biota sampling.

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potential radiological contamination within an Individual Hazardous Substance Site (IHSS); and/or who, in the performance of their duties, have the potential for imminent contact with radioactive materials, sources, and/or radiation producing devices; or who will enter a soil contaminated area -- must complete course work in Radiation Worker Level II Training and repeat biannually to be up-to-date (current) with training requalification requirements; and

- Individuals who do not perform intrusive work activities within a RCA, but are required to be in a RCA for activities such as documenting, field verification, or touring, must complete Radiation Worker Level I Training.

The Radiation Worker training courses are provided by EG&G to ensure individuals understand the potential radiological hazards and the methods that will be used to monitor radiological hazards by using devices such as field survey instruments and personal dosimeters.

4.1.3 Field Experience and Site Briefing

In accordance with 29 CFR 1910.120 (e)(3)(i-iv), workers on uncontrolled hazardous waste sites must also receive actual field experience. The requirements for this training are detailed in Procedure 1-62200-HSP-21.03, *Hazardous Waste Operations*. The required length of the field experience ranges from 1 to 3 days depending on the worker's job tasks. DOE guidance allows experience from one site to be applied to another site provided that the employee is performing similar work and site conditions are similar. The scope of this application is limited to RFP.⁶ Site-specific field experience shall be conducted under the direct supervision of a trained, experienced supervisor.

⁶ Reference the following documents: (1) OSHA Training Requirements for Hazardous Waste Operations (Appendix B) and (2) DOE Office of Environmental Safety and Health (EH), December 1991, page 6.

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A pre-entry briefing, as required by 29 CFR 1910.120 (b)(4)(iii), shall address all sections of the HASP, associated SOPs and JSAs, and any additional building or site indoctrination in enough detail so that site personnel can safely perform their assigned tasks. The pre-entry briefing must be conducted prior to the initiation of field activities.

Subcontractors must provide the same level of training to their employees. Training records will be inspected by the SHSC and the RE representative and documented on the *Field Experience Checklist Form* [Figure 4-1].

4.1.4 Hazard Communication Training

Hazard Communication training shall address the hazards associated with the commercial chemical products used on an ER site and other hazardous waste constituents present at the ER site. Basic Hazard Communication training is provided through a Computer-Based Training (CBT) course available on plant site which is self-paced and takes approximately one hour to complete. Procedure 1-15310-HSP-9.07, *Hazard Communication Program*, defines the requirements and components of a written Hazard Communication Program. Once the chemicals to be used have been identified, training on these specific chemicals is to be conducted during the site-specific training.

Subcontractors must institute a Hazard Communication training program for their employees and address the site hazards in their project training program. IH&S will audit the Hazard Communication Program for EG&G, as well as subcontractor employees, to verify that it is properly implemented and that hazardous chemical information is appropriately disseminated among all worker groups on the site. Verification of this program is based upon compliance to Procedure 1-15310-HSP-9.07, *Hazard Communication Program*, and appropriate requirements.

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4.1.5 Rehearsal of Emergency Response Plan

The *Hazardous Waste Operations and Emergency Response* Standard, 29 CFR 1910.120, requires periodic rehearsal of the Emergency Response Plan. The ERHSO shall coordinate these rehearsals during the project activity start-up period which shall be formally documented and used to evaluate the effectiveness of the Emergency Response Plan. The SHSC will coordinate support for emergency response rehearsals so that both EG&G and Subcontractors are prepared in the event of an emergency.

An emergency response rehearsal will be held for each major ER site (an OU) and will be coordinated to include all long-term (greater than 6 months) subcontractors. Short-term (less than 6 months) subcontractors will receive a briefing detailing the specific requirements of the emergency response plan. The briefing will be provided by the SSO during the pre-entry Site Briefing. The application of an emergency response exercise as to project duration will be determined by the ERHSO and the PM.

4.1.6 Visitor Briefings

All visitors requiring access to an ER remedial work site shall receive site orientation prior to gaining access to the site.

NOTE: The completion of this training does not allow the visitor into controlled areas of the ER site (i.e., visitors are not allowed to enter the Contamination Reduction Zone, Exclusion Zone, or Radiologically Controlled Areas based solely upon the briefing).

This training (visitor briefings) is designed to provide sufficient information on site hazards and control measures at the remedial project site to prevent the visitor from violating any safety requirements. While at the remedial project site, visitors shall be escorted by an

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appropriately trained worker or supervisor at all times.

4.1.7 Tailgate Safety Meetings

"Tailgate" or "Toolbox" safety meetings shall be conducted, as a minimum, weekly or as necessary by the respective EG&G PM or by the respective Subcontractor SSO. The meeting need not be lengthy or elaborate, but it must be sufficient to cover the health and safety issues relevant to the project's tasks. Relevant topics for these meetings shall include:

- Health and safety hazards, engineering controls, and necessary protective equipment for current operations;
- Revisions to the HASP;
- New material safety data sheet (MSDS) forms relevant to the remedial project work site;
- All documented and/or observed unsafe acts and conditions on the remedial project work site since the previous meeting, a clarification of the safety requirements violated, and methods to prevent recurrence; and
- Other topics as specified in the Procedure 1-A68-HSP-2.01, *Safety Meeting and Safety Inspections* (i.e., on-the-job safety, area hazards, fire reporting and responses, eye washes, safety showers, decontamination protocols, nuclear safety, physical hazard safety, etc.).

All workers are required to attend these meetings and sign an attendance sheet attached to the meeting minutes. Meeting minutes will be documented on Form RF-7060, *Safety Summary Report*, contained in Procedure 1-A68-HSP 2.01. This health and safety practice provides specific implementation and programmatic requirements that must be adhered to by EG&G and subcontractors.

The EG&G PM or the Subcontractor SSO, as appropriate, shall follow up with absentees by

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reviewing the meeting minutes with them and having them sign the attendance sheet. The EG&G PM or the subcontractor SSO, as appropriate, shall ensure that minutes and attached attendance sheets are completed and distributed to the ERHSO. Minutes of the meetings shall be retained on file at the remedial project work site and archived following project completion by the PM. Upon request, such records will be made available for inspection.

4.1.8 Additional Health and Safety Training

In addition to training requirements stated under 29 CFR 1910.120, additional health and safety training requirements may be necessary for anticipate activities where OSHA standards 1910 and 1926 or this Program Plan requires it. For example, the HASP may require training in Hazard Communication, First Aid and CPR, Fire Extinguisher or Fork-Lift Usage, and so on.

EG&G provides a variety of specialized training programs for site workers relevant to the workers specific assignment. Training requirements are defined in the HASP and related to the hazards to be encountered and tasks to be performed. Departmental Training Coordinators may be contacted for information regarding scheduling and course availability. Additionally, specific training course availability is listed in the Boilerplate [Appendix C, Section 4].

4.2 Implementation of Training

Training for EG&G personnel is provided by PBT. Most training is conducted in-house with the assistance of various EG&G Subject Matter Experts. Some training is provided through agreements with academic organizations and subcontractors. The ERPD Project Manager of Training and Qualifications is the point of contact for EG&G training course availability.

The training of subcontractors for work planned at RFP is the responsibility of the subcontractor. Training must meet the performance requirements of EG&G policies and procedures, OSHA standards, and DOE orders. EG&G provides CBT courses for subcontractor

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personnel covering specific topics. EG&G PMs provide interface for subcontractor personnel requiring EG&G training support.

4.3 Verification of Training

All EG&G personnel, agency representatives, and subcontractors must maintain documentation of completed training for each assigned individual prior to beginning field work. Verification of training may be accomplished through the Readiness Review process in accordance with ERPD Procedure 3-21000-ADM-18.03, *Readiness Review*. Documentation of training must be available for review at field offices for all subcontractors.

4.4 Training Records

All health and safety training, conducted by EG&G, shall be documented as required by the EG&G PBT Department. All training records for EG&G personnel will be maintained by the Plant Training Records group in accordance with 29 CFR 1910.120. Successful completion of the training specified in this section and documentation of completion through the Readiness Review, is required for all employees prior to starting work at remedial project sites. Signature verification is required to document that site personnel have read, understood, and will comply with all requirements stated in the HASP and HSP Manual training requirements applicable to the remedial project site.

Occupational Safety and Health Administration
FIELD EXPERIENCE CHECKLIST
Environmental Restoration Management

Figure 4-1

Name: _____

Company Name: _____

Telephone Number: _____

Employee Number/Social Security Number (Subcontractors Only): _____

Project Name/Operable Unit Number : _____

Field Experience Supervisor Name : _____

Date supervisor completed OSHA Supervisor training: _____

Date of field experience checklist completion: _____

If employee is required to complete the 24-Hour OSHA course , then a 1 Day Field Experience is required.

If employee is required to complete the 40-Hour OSHA course , then a 3 Day Field Experience is required.

Circle the appropriate level of field experience required: 1 Day # 009-691-01
3 Days # 018-691-07

Field experience consists of the completion of this checklist and supervision of the employee for 1 or 3 days, as identified.

Instructions for use:

This checklist is designed to satisfy the Field Experience requirements of 29 CFR1910.120 (e).

The employee and the individual who will provide the direct supervision during the 1 or 3 days of field experience are to review this checklist together. The supervisor will discuss the applicable areas to his/her work area. If an item is not applicable, place N/A on the initial line. After discussing each item on the back of this form, the item is initialed by the supervisor. The completed checklist will be signed and dated by the employee and supervisor.

NOTE: If an employee changes projects and/or Operable Units and new hazards/chemicals are introduced, then a review of the new information is required to be documented on another field experience form. A reference to the original date of the field experience should be indicated on the second form. Supervision of the employee for 1-3 days may not be required again.

Return this form to Environmental Restoration Management (ERM) Training & Qualification, Bldg. 080.

See back of form for the actual checklist.

Initials

Supervisor initials after each item is complete.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

I certify that I have completed this field
experience with employee identified below.

Printed Name/Signature of Employee/Date

Action

Verified current completion of the
appropriate required initial OSHA
training: 40-Hours or 24-Hours

Completed Site-Specific briefing and/or
Buffer Zone Indoctrination
*(List items discussed during the
briefing)*

Completed a Required Reading form for
the Site Specific Health and Safety Plan
and/or ER Health and Safety Program
Plan. *(Required Reading forms are
available through ERM Training &
Qualification personnel)*

Completed a review of the work plan
and/or field sampling plan and applicable
procedures. *(Required Reading forms
are available through ERM Training &
Qualification personnel.)*
-Attended a Pre-Evolution briefing for
project

Discussed and ensured that the employee
understood the following applicable
topics:

- Site-specific health, safety, and
other workplace hazards
- Appropriate measures required to
protect against workplace hazards
- Site hazard/problem reporting
procedure
- Location of safety equipment
- Proper personnel protective equipment
procedures
- Proper decontamination procedures
- Proper Spill Response procedures
- Proper Emergency Response
actions

Employee demonstrated the ability to
safely follow applicable work procedures
for the required _____ (8
OR 24 hours as appropriate).

Printed Name/Signature of
Supervisor/Date

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CHAPTER 5

MEDICAL SURVEILLANCE

5.0 Introduction

The Occupational Medicine (OM) Department, under the direction of the OM Director, is responsible for the RFP Medical Surveillance Program. The Medical Surveillance Program is designed to detect early signs of adverse health effects from chemical, radiological, and physical hazards on the RFP site and to facilitate protective measures. Qualified occupational medicine physicians shall conduct the required medical surveillance. As a minimum, subcontractors must maintain a medical surveillance program which adequately demonstrates compliance to 29 CFR 1910.120 (f), *Medical Surveillance*.

The OM Department provides, at no cost to the employee and without loss of pay, comprehensive physical examinations to all EG&G employees. The exams are used to assess the health status and physical fitness of employees and to ensure that work assignments do not exceed employee's physical capabilities.

The medical surveillance requirements described in the *Hazardous Waste Operations and Emergency Response* Standard [29 CFR 1910.120 (f)] provide the framework for a medical surveillance program to be used for hazardous waste site workers and is established in Procedure 1-62200-HSP-21.03, Section 5.6, *Medical Surveillance*. The standard includes the requirement that baseline, periodic, and termination medical examinations be performed and documented.

In addition, 29 CFR 1910.120 (f) requires that the following employees categories be covered:

- Employees who may be exposed to hazardous substances at or above the permissible

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exposure limit or published exposure limit for 30 days or more per year;

- Employees who wear respirators for more than 30 days per year; or
- Employees who develop symptoms of over exposure.

Because of the potential hazards associated with environmental restoration projects, all hazardous waste site workers meeting any one of the stated categories, will be required to participate in a medical surveillance program.

5.1 Subcontractor Medical Surveillance Program

Subcontractors are responsible for providing and implementing a medical surveillance program for their personnel participating in remedial project work at the RFP. The subcontractor medical surveillance program must meet all of the requirements of this Program Plan, 29 CFR 1910.120 (f), DOE orders, and RFP policies and procedures.

Subcontractors working at environmental restoration sites will be provided with a copy of the EG&G Work Plan for the Project on which they will be working. Chemical and radiological hazards that have been identified at the site will be discussed in the Project Work Plan. The Plan Workbook provides a methodology for conducting a Hazard Assessment. This information, and any additional historical, operational, or available sampling information, shall be provided to the consulting physician so that he/she understand the scope of work and the extent of the investigation. Subcontractors must maintain, at a minimum, *Physician Consent Forms* for current physical and respirator use approvals.

5.2 EG&G Medical Surveillance Program

EG&G personnel assigned to work at ER sites will be identified to the OM Department by their supervisor. In addition, a copy of the Hazard Assessment from the Plan Workbook, for the site to which they are assigned, shall be provided to the OM Department. Based on environmental,

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industrial hygiene, and radiological sampling data, as well as a description of tasks and historical RFP data, the OM Department physicians will use their expertise to determine how the standard RFP medical examination will be conducted to cover the hazards of concern. EG&G employees assigned to work on an ER site will receive individual examination based on potential exposures and their personal health status prior to engaging in on-site activities.

The content of the medical examination will be determined by the OM Director or, in certain situations, by a private attending physician and may include the following elements:

- The completed employee *Medical and Occupational History Form* (RF-46498);
- An annual comprehensive physical examination;
- A chest x-ray (as required);
- A pulmonary function test (FEV/FVC);
- A electrocardiogram (EKG);
- A complete blood count with differential;
- Bio-chemical profiles (a series of blood tests);
- An urinalysis (dipstick and microscopic);
- A visual acuity examination;
- A slit lamp examination;
- An audiogram;
- A radiological bioassay; and
- A respirator fit and qualification examination.

The examining physician will provide a written opinion of the employee's ability and fitness to perform the required job task(s) and to wear a respirator. The physician will take into consideration:

- Temperature extremes that may be encountered as a result of environmental conditions and/or wearing protective clothing;

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- Physical exertion; and
- Respirator usage.

The examining physician's opinion will be annotated on the *Medical Surveillance Program, Hazardous Waste Operations Form* [Figure 5-1].

The content of the follow-up examination and employee termination examination will include at least those items included in the baseline examination and give consideration to any additional health hazards encountered at the site since the employee's most recent examination. This will allow the physician to make comparisons to previous data, possibly detect early signs of adverse health effects, and facilitate protective measures. The attending physician may add to the testing and/or examination as he/she sees fit.

5.2.1 Frequency of Medical Examinations

EG&G employees assigned to work in or around a ER remedial action site shall undergo a baseline medical examination prior to initiating on-site activities. Employees shall have a follow-up medical examination at least once each year and at termination of employment or reassignment if the employee has not had an examination within the last six months. The OM Director may elect to have examinations, consultations, and/or medical surveillance tests conducted on a more frequent basis. An EG&G employee will be given another physical examination by the OM Department if the individual:

- Is suspected of having an overexposure to hazardous wastes and/or chemicals used on site;
- Develops a lost-time illness of 5 working days or more;
- Sustains a lost-time injury; or
- Receives a Committed Effective Dose Equivalent (CEDE) greater than 5 rem.

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The re-examination requirements shall be specified by the OM Director. The OM Department shall document that the employee is fit to return to work or specify any activity restrictions as outlined in Procedure HSP-4.03, *Medical Restrictions*. Subcontractors are expected to follow a similar protocol in their medical surveillance program.

5.2.2 Availability of Service

The OM Department is located in Building 122 and can be reached by phone at 966-2594. The full staff is on duty from 7:30 a.m. to 4:00 p.m., Monday through Friday. The registered nursing (RN) staff is available from 6:30 a.m. to 10:00 p.m., Monday through Friday. A physician and a nurse are always on call, for any emergency, during off hours. Weekend coverage (Friday 10:00 p.m. through Monday 6:30 a.m.) is provided by Emergency Medical Technicians (EMTs). They can be contacted at 966-4336 and will meet employees in the OM Department or responded to the site of any emergency. Medical assistance will be provided to subcontractors by EG&G in the event of an emergency. Emergency response procedures and pertinent phone numbers are identified in Chapter 7 of the Program Plan and in each HASP.

5.2.3 Transportation for Medical Reasons

EG&G will provide transportation for employees (if it is safe to do so as determined by the Medical Staff) either to their home or to an appropriate medical facility for:

- An emergency situation. EMT's, with the assistance of an OM physician, will determine the appropriate mode of transportation for the illness/injury requiring air or ground ambulance transport; or
- A non-emergency situation. If ambulance transport is not required, supervisors will be asked to arrange transportation.

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In an incident where an employee is injured and requires non-ambulance transport to an off-site medical facility (once authorized to do so by the medical staff), the supervisor or designee shall accompany that person (as a representative of the company) to interface with outside authorities (if necessary) and to provide further transportation for the employee as appropriate. Supervisors unable to arrange transportation on weekends or during night work, should contact the RFP Shift Superintendent (Emergency Coordinator) for assistance. Ambulance service will be provided to subcontractors by EG&G in the event of an emergency.

5.2.4 Medical Restrictions

The OM Department has the responsibility of assisting management in ensuring the placement of employees in work situations that will not create undue hazard(s) to the individual(s), co-workers, the public, and the general environment. The OM Department is also responsible for applying preventive medical measures toward the maintenance of good physical and mental health of employees. An element of these measures is verification that employees are current with medical surveillance examinations; typically, an annual requirement.

5.2.5 Supervisor's Responsibility

The supervisor has several responsibilities pertaining to medical surveillance which include:

- Confirming, through the OM Department, that employees are current with medical surveillance requirements (typically, an annual requirement), and do not have restrictions that will interfere with their job performance;
- Recognizing signs or symptoms of exposure to site contaminants or environmental factors such as heat stress and cold stress (information pertaining to recognition of such signs or symptoms may be acquired through OSHA Health and Safety Supervisor training, Hazard Communication training, and Material Safety Data Sheets);

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- Sending employees to the OM Department for a work restriction re-evaluation if there has been a change in the employee's physical or mental condition; and
- Consulting personnel files regarding employee restrictions prior to placing the employee in a new position.

5.2.6 Employee's Responsibility

Medical surveillance is also the responsibility of each employee. Employees have responsibilities similar to the supervisors in this area; these responsibilities include:

- Advising their supervisor of any actual or intention of pregnancy;
- Advising their supervisor of any physical or mental conditions which could affect work performance;
- Recognizing the easily detectable signs or symptoms of exposure to site contaminants and environmental factors such as heat stress and cold stress (information pertaining to recognition of such signs or symptoms is acquired through OSHA 40-hour Health and Safety training, and Site-Specific training, Hazard Communication training, and Material Safety Data Sheets);
- Informing their supervisor of all occupational injuries or illnesses immediately;
- Reporting to the OM so that any limitations can be verified or restrictions can be imposed (restrictions recommended by an off-site physician must be presented in writing to the OM Department); and
- Reporting to the OM Department for re-evaluation as scheduled.

5.2.7 Work Assignments

A worker may be temporarily or permanently reassigned based on their mental or physical condition. The OM Department will perform an assessment, communicate the need for a medical restriction to appropriate persons, and provide follow-up evaluations on the restriction status.

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5.2.8 Medical Records

All medical information will be included in the individual's EG&G medical file including laboratory reports, EKG reports, X-ray reports, health histories, physical examinations, and letter/reports from employee's personal or referral physician.

Medical and exposure monitoring records shall be maintained by the OM Department in accordance with the requirements of 29 CFR 1910. 20, *Access to Employee Exposure and Medical Records*, and of Procedure HSP-4.05, *Access to Employee Medical and Exposure Records*. Medical surveillance records at ER remedial project work sites shall be retained on site in a *Confidential Employee Training and Medical Certification File*. These records include:

- The *Medical Surveillance Information Sheet* [Figure 5-2], and
- The *Physician's Written Opinion Documentation*.

NOTE: Subcontractors will maintain medical *Fit-For Duty Documentation* on site for their personnel.

5.3 Bloodborne Pathogen Exposure Control Plan

A Bloodborne Pathogen Exposure Control Plan shall be established and implemented for any activities which may lead to occupational exposure and/or contact with blood or other potentially infectious material as required by 29 CFR 1910.1030, *Bloodborne Pathogens*. EG&G has implemented this requirement in Procedure 1-15500-HSP-4.17, *Bloodborne Pathogens Exposure Control Plan*. This represents the minimal requirements to which a program must be established. Each employer having an employee(s) with occupational exposure to a bloodborne pathogen shall establish a written Bloodborne Pathogen Exposure Control Plan designed to eliminate or minimize employee exposure.

OCCUPATIONAL HEALTH DEPARTMENT
ROCKY FLATS PLANT

MEDICAL SURVEILLANCE PROGRAM
HAZARDOUS WASTE OPERATIONS

PHYSICIAN'S CHECKLIST AND WRITTEN OPINION

EMPLOYEE NAME:	WORK AREA:
SSN:	JOB:

PART A - PHYSICIAN'S CHECKLIST

I have examined this employee and have been provided with the following:		YES	NO	NOT APPLICABLE
1.	A medical and work history with specific emphasis related to the handling of this substance and health hazards, and to the fitness for duty including the ability to wear any required Personal Protective Equipment under conditions (i.e., temperature extremes) that may be expected at the work site.			
2.	A copy of the OSHA <u>Hazardous Waste Operations and Emergency Response</u> , CFR 1910.120.			
3.	A description of the employee's duties as they relate to the employee's exposure.			
4.	The employee's representative or anticipated exposure level.			
5.	A description of any personal protective and respiratory equipment used or to be used.			
6.	Information from previous medical examinations that is not otherwise available to me i.e., medical records obtained from employment having a positive history of exposure. This employee's written consent was required to obtain these medical records.			

PART B - PHYSICIAN'S WRITTEN OPINION (PWO)

YES NO

1.	Are there any detected medical conditions that would place this employee at an increased risk of material health impairment from work in hazardous waste operations or emergency response, or from respirator use?		
If YES, please list the conditions, e.g., shortness of breath:			
a.			
b.			
c.			
d.			
e.			

2.	Are there recommended limitations on the employee or on the use of personal protective equipment such as respirators?	YES	NO
If YES, please list the limitations and if temporary or permanent:			
	LIMITATION/RESTRICTION	TEMPORARY	PERMANENT
a.			
b.			
c.			
d.			

3.	The employee has been informed by me of the results of this medical examination and any medical conditions that may require further examination and treatment.	YES	NO
----	--	-----	----

4.	This employee has been provided with a copy of this PWO? If YES, the date employee was provided with PWO: / /	YES	NO
----	--	-----	----

EMPLOYEE SIGNATURE:	DATE:
---------------------	-------

PHYSICIAN	SIGNATURE:	DATE:
	PRINT NAME:	

Doctor, do not reveal specific findings or diagnosis unrelated to occupational exposure.

Distribution: White - Employee Chart
Canary - Employee
Green - Central Records

Figure 5-2

MEDICAL SURVEILLANCE INFORMATION SHEET

Employee Name _____ SSN _____

Title _____

Operable Unit _____ Phase _____

Describe the employee's duties as they relate to the exposures at the remedial project site:

Detail the estimated exposure levels anticipated for this employee at this remedial project site:

Describe the Personal Protective Equipment (PPE) that this employee is anticipated using at this remedial project site:

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CHAPTER 6

HAZARD EVALUATION PROCEDURES

6.0 Overview

A hazard assessment must be included in the approved HASP for each task performed at ER sites prior to the initiation of field work. The assessment shall provide chemical, radiological, biological, and physical hazards information such as:

- Chemical, physical, and radiological hazards of the contaminants present;
- Media in which the contaminants exist (i.e., air, water, soils);
- Routes of potential exposure (i.e., inhalation, ingestion, skin permeability);
- Acute and chronic health effects resulting from exposure;
- Fire, explosion, and reactivity hazards;
- Weather conditions and associated hazards from temperature extremes, high winds, lightening and storms;
- General safety hazards (i.e., slippery or unstable surfaces, steep or uneven grades, electrical hazards, material handling hazards);
- Noise hazards; and
- Biological hazards (i.e., insects, rodents, snakes).

Toxicological references are to be utilized to further evaluate the associated risks of known contaminants. These assessments, engineering controls, work practices, and personal protective equipment requirements shall be developed to maintain radiological exposures As Low As Reasonably Achievable (ALARA) and hazardous chemical exposures below OSHA Permissible Exposure Limits (PELs) or published exposure limits during field operations as defined in the Plan Workbook.

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The hazards associated with work on an ER site can be assessed by reviewing existing data and conducting on-site assessments during field operations. Existing chemical and radiological data sources include EG&G documents, environmental monitoring data, historical process data, and waste stream characterizations.

This Chapter describes sources of information available at the RFP and off-site and types of data available from these sources. It further describes the roles that key departments play in providing site hazard information needed to characterize the risks at Operable Units.

6.1 Sources of Existing Information

The Industrial Hygiene (IH) Department maintains monitoring data related to employee exposures to chemicals. Summaries of available IH monitoring data will be available for inclusion into appropriate HASPs. The IH Department shall develop the chemical monitoring requirements for HASPs.

The Rocky Flats Environmental Database System (RFEDS) Department manages a database containing the analytical results of groundwater, surface water, soil, and air samples. The database includes chemical and radiological information. Data can be retrieved for an area of the RFP, or for a specific groundwater monitoring well, soil boring, or sampling location, or sorted to generate results from a certain time period. The RFEDS Department also maintains published documents that summarize specific sites. The *Historical Release Report for the Rocky Flats Plant Manual*, Manual No. 2100-TR-12501.01 (Volumes I and II), provides valuable information on known or potential environmental contaminants of concern. The document covers Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern (PAC), and Areas of Concern (AC).

The Waste Operations (WO) Department coordinates waste disposal activities at the RFP. This department documents waste stream composition to ensure compliance with disposal

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regulations.

The EPM Department keeps records of site-wide effluent monitoring. *Site Environmental Reports* are published monthly and annually by the EPM Department. The Clean Water Act (CWA) Department should be contacted for reports which describe chemical and radiological effluent monitoring activities, summarize the monitoring results, and demonstrate compliance with environmental regulations.

Radiological monitoring data from specific buildings or areas of the RFP are available from the Radiological Building Engineer or Records Management. The RE and RO Departments share responsibility for ensuring monitoring of employees for potential exposures to radiological materials. For example, RE develops monitoring programs which are then implemented by RO.

6.2 Chemical Hazards

Potential chemical contaminants at ER sites identified in the IAG include, but are not limited to, organic solvents, hydrocarbon fuels, heavy metals, corrosives, peroxides, toxic gases, mixed wastes, and flammables. An oil sludge pit, chemical burial area, liquid dumping area, drum storage area, reactive metal destruction area, gas detoxification area, hazardous waste storage area, a waste peroxide drum burial site, a solvent burning ground, and waste spill areas are examples of ER sites where these types of compounds may be found. Environmental assessment information continues to develop as progress towards cleaning up the site is made.

Organic solvents that have been identified include trichlorethane, benzene, carbon tetrachloride, perchloroethylene, trichloroethylene, methylene chloride, acetone, dichloroethane, dichloromethane, chloroform, butanone, methyl ethyl ketone, peroxide, xylene, toluene, bis(2-ethylhexyl)phthalate, and ethylene glycol. Several of these organic solvents are flammable and have varying degrees of toxicity.

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The most common routes of exposure for volatile organics are inhalation and skin absorption. Many of the organic compounds that have been identified are chlorinated, which typically affect the central nervous system, cardiovascular system, respiratory system, the kidneys, and the liver. Effects of exposure to these solvents can range from light-headedness to death depending on the level of exposure. Direct or prolonged skin exposure can result in dermatitis and fissuring which can increase a worker's susceptibility to infection and increased exposure. The primary constituents of concern in fuel products include benzene, toluene, and xylenes. Of these three aromatic chemicals, benzene has the lowest permissible exposure limit and is a known carcinogen. Personal exposure monitoring for benzene should be conducted when fuel products are potentially present.

Heavy metals have also been identified on many of the sites covered under this Program Plan. The primary routes of exposure for metals are inhalation and ingestion. Heavy metal toxicity ranges from acute illness to chronic organ effects and to carcinogenicity. Metals identified at ER sites include aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, mercury, nickel, potassium, silver, sodium, selenium, strontium, thallium, vanadium, and zinc.

Exposure to caustics and acids most often cause acute rather than chronic effects. Obvious symptoms of exposure to corrosives include eye, skin, and respiratory tract irritation and burns. Corrosives identified as potentially present at ER sites include sulfuric acid, nitric acid, hydrofluoric acid, hydrochloric acid, sodium hydroxide, and other sulfates, nitrates, and hydroxides. When acids and caustics are mixed, toxic gases such as chlorine and hydrogen chloride can be generated.

Small concentrations of peroxides have been identified in spill locations at drum burial sites. Peroxides are oxidizers and can be explosive hazards depending on the concentration and ambient conditions. Many peroxides are sensitive to heat, impact, friction, or contact with other chemical compounds such as acids, acid alcohols mixtures, and metals. Peroxides can also ignite

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organic materials such as acetone and cotton.

Toxic gases may be present at many sites as a result of volatilization, off-gassing, container ruptures, and chemical or biological decomposition. Some of the more toxic gases that could be present include chlorine, hydrogen chloride, carbon monoxide, sulfur dioxide, hydrogen cyanide, ammonia, and hydrogen sulfide.

6.3 Radiological Hazards

Radioactive isotopes, used or generated at the RFP, which may be detected at ER sites include plutonium, uranium, americium, cesium, strontium, and tritium. ER worksites that have been identified as radiologically contaminated include the solar evaporation ponds, drum storage areas, hazardous waste storage areas, original uranium chip roaster area, radioactive liquid waste storage tanks, waste spill sites, cooling tower ponds, and a former radioactive soil burial site. In addition, some soil, groundwater, and surface water investigation sites contain radiological components.

The risks associated with overexposure to ionizing radiation vary with the dose, route of exposure, and the type of radiation. Based on historical assessment data, acute, high-level exposure to radioactive materials at ER sites is not likely to occur, whereas, chronic, low-level exposures are a possibility. Uncontrolled, chronic exposures above background may contribute to an increased risk of cancer. A further discussion of radiological hazards is provided in the Plan Workbook.

6.4 Monitoring Program

A program to monitor remedial site personnel shall be developed and implemented prior to and during all phases of the field project or as determined by monitoring results. The objective of the Monitoring Program is to ensure adequate protection of workers and compliance to

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applicable regulations and standards. As a minimum, monitoring conducted shall ensure personnel exposures are maintained below "permissible or published" exposure limits and assure that engineering controls, work practices, and PPE are adequate for the tasks performed. Appendix A identifies policies and standards applicable to a site monitoring program.

The Plan Workbook delineates the program requirements for a site monitoring program that shall be included in HASPs. The development of the monitoring program shall rely upon RFP implementation and compliance documentation when possible, defining a program that incorporates the same or more restrictive requirements.

The monitoring program defined in the HASP shall include the following elements:

- Air monitoring and personnel (breathing zone) monitoring requirements for identified hazardous substances;
- Environmental sampling (thermal, noise, radiation, and mechanical) requirements based upon published or permissible exposure limits;
- Sampling methodologies, frequency, and instrumentation required to perform air, personnel, and environmental monitoring;
- Requirements for sampling analysis, sampling data review, and records retention requirements;
- Identification of employees at risk;
- Monitoring instrumentation inspection, calibration, and maintenance requirements;
- Identification of imminent hazards and response requirements;
- Presite safety inspections for physical hazards and equipment; and
- Material OSHA safety inspection prior to and during field activities.

Each element shall have Departments and/or individuals identified for implementation and compliance. In addition, retention of project records shall include health and safety data. Records shall be maintained according to Procedure 3-21000-ADM-17.01, *Administrative*

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*Records Screening and Processing.***6.5 Heat Stress**

Workers assigned to tasks which require the use of PPE are at risk of developing heat stress when ambient temperatures exceed 70°F. Impermeable clothing limits the body's normal heat exchange mechanisms and increases energy expenditure. Heat stress can cause health effects which range from heat fatigue to serious illness or death. Signs and symptoms of heat stress include:

- HEAT RASH that results from continuous exposure to heat or humid air;
- HEAT CRAMPS that are caused by heavy sweating with inadequate electrolyte replacement (signs and symptoms include muscle spasms and pain in the hands, feet and abdomen);
- HEAT EXHAUSTION that occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular inefficiency or dehydration (signs and symptoms include pale, cool, moist skin, heavy sweating, dizziness, nausea, and fainting); and
- HEAT STROKE which is the most serious form of heat stress, occurs when the body's mechanism for temperature regulation fails and rises to critical levels (signs and symptoms include red, hot, usually dry skin; lack of reduced perspiration; nausea; dizziness; confusion; strong, rapid pulse; or coma).

NOTE: Immediate action must be taken to cool the body before serious injury and death occur. Medical help must be obtained.

Guidance for a Heat Stress Monitoring Program may be obtained from the current *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices* published by the American Conference of Governmental Industrial Hygienists (ACGIH). For worker's wearing semipermeable or impermeable ensembles, the ACGIH standards may not be

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used. For these situations, workers shall be monitored when the temperature and work area is above 70°F (21°C). Monitoring guidelines for this situation are given in *Occupational Safety and Health Guidelines Manual for Hazardous Waste Site Activities* published by the National Institute of Occupational Safety and Health, the Occupational Safety and Health Administration, the United States Coast Guard, and the Environmental Protection Agency (NIOSH/OSHA/USCG/EPA).

6.6 Cold Stress

When working outdoors in temperatures below freezing, workers can become frostbitten. Exposure to extreme cold can cause severe injury to the body surface or can result in profound generalized cooling, causing death. Efforts shall be made to prevent wet skin or contact of the skin with wet clothing. In cold weather, precautions should be taken to prevent cold exposure by wearing properly insulated garments and taking warm-up breaks when necessary. A backup set of warm dry clothing is recommended, or measures taken to ensure workers do not perform physically exerting tasks before they exit to a cold environment in order to limit perspiration which promotes heat loss. Symptoms of cold exposure are:

- FROST NIP OR INCIPIENT FROSTBITE which is characterized by sudden blanching or whitening of the skin;
- SUPERFICIAL FROSTBITE which causes the skin to become waxy or white and superficially firm, but resilient beneath;
- DEEP FROSTBITE which is characterized by cold, pale, solid skin tissues; and
- SYSTEMIC HYPOTHERMIA which is caused by exposure to freezing or rapidly dropping temperature, and may occur in temperatures between 10-15 degrees above freezing. Symptoms may be exhibited in the following stages: shivering, apathy, listlessness, sleepiness, and rapid cooling of the core body temperature to less than 95°F; unconsciousness, glassy stare, slow pulse, and slow respiratory rate; and death.

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Guidance for a Cold Stress Monitoring Program may be obtained from the current *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices* published by the ACGIH.

6.7 Noise Exposure

Workers can be exposed to hazardous noise levels while working on ER sites when using heavy equipment such as mixers, pumps, air compressors, electrical generators, drill rigs, heavy construction equipment, and jack hammers. Areas where noise levels equal or exceed 85 decibels (dBA) shall be identified and posted. The requirements of Procedure HSP-7.06, *Hearing Conservation Program*, shall be implemented and complied with. Efforts shall be made to minimize noise exposure to levels below those stipulated in Procedure HSP-7.06, or adequate hearing protection will be required for all exposed personnel.

Personnel identified as being exposed to noise, equal to or exceeding an 8-hour time-weighted average sound level of 85 dBA measured on the A-Scale [Figure 6-1], shall participate in a hearing conservation program as stipulated in Procedure HSP-7.06. Personnel shall be aware of the impact of high noise on site communications (i.e., a decrease in communication ability causing an increase in accident risk). Personnel shall also take care in the handling and the use of inserting hearing protection in the EXCLUSION ZONE, as this may introduce and exposure route through the ear canal.

6.8 Mechanical Hazards

There are numerous mechanical hazards associated with the tasks which are scheduled at identified ER sites. Potential mechanical hazards at ER sites include hazards associated with the operations of heavy equipment such as air compressors, backhoes, drill rigs, trenchers, electrical motors, and pumps. Heavy equipment must be maintained in good working order. Motors, chases, blades, bladeholders, tracks, drives, hydraulic and pneumatic mechanisms, and

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transmissions shall be inspected each day. Minimum requirements for operating and maintaining heavy equipment include:

- Ensuring that machinery is not used on inclines where it could roll over;
- Not leaving running equipment unattended;
- Requiring seat belts for equipment that have roll over protective structures;
- Providing at least one 2-pound Class B/C fire extinguisher in a vehicle located within 100 feet of construction operations; and
- Maintaining an appropriate amount of fuel in equipment for emergency use.

Underground and overhead utilities could be potential hazards on some locations. Guidance concerning electrical safety practices are detailed in Procedure 1-15320-HSP-2.08, *Lockout/Tagout*, in Procedure HSP-5.00, *Electrical Safety*, and in Procedure 1-C18-HSP-24.01, *Safety and Health Responsibilities for Construction Activities*. These health and safety procedures should be referenced as needed. Additionally, information concerning the safety requirements for the use of cranes and derricks is detailed in Procedure 1-62300-HSP-12.01, *Hoisting and Rigging*.

Job Safety Analyses (JSAs),⁷ Standard Operating Procedures (SOPs), and/or Waste Operations (WO) Procedures may be written prior to performing tasks at ER sites to identify potential hazards and to document a safe procedure for performing the task as identified by RFP policies, procedures, and practices. Applicable JSAs, SOPs, and WO Procedures or any additional work control documents will be identified during the ERPD Readiness Review process.

Construction activities are to be performed according to the requirements of 29 CFR 1926, *Safety and Health Regulations for Construction*. The EG&G document, *Section 01700 of the Division I for Service Subcontracts* contractually defines health and safety requirements for

⁷ Procedure HSP-2.11, *Job Safety Analysis*, provides information and instructions on preparing a JSA.

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subcontractors involved in ER construction related activities.

6.9 Confined Space Entry

Confined space entry may be required on ER sites. RFP procedures for working in a confined space can be found in Procedure 1-15310-HSP-6.04, *Confined Space Entry Program*, and will be followed when a confined space entry is to be made. The procedure defines the different types of confined spaces and addresses the responsibilities and training requirements as well as topics such as ventilation, atmospheric testing, protective equipment, confined space entry permits, and posting. A further discussion of confined space entry requirements is included in the Plan Workbook.

6.10 Respiratory Protection

A Respiratory Protection Program shall be clearly defined in the HASP. The program shall meet the requirements of:

- Applicable DOE Orders;
- OSHA Standard 29 CFR 1910.134, *Respiratory Protection*;
- General Industry Standards for Respiratory Protection on ANSI Standard Z88.2-1992; *Practices for Respiratory Protection*; and
- Other applicable federal regulations.

At a minimum, the Respiratory Protection Program shall incorporate the following elements:

- Physiological and psychological limitations for respirator wearers;
- Respiratory selection;
- Training requirements;
- Respirator fit requirements (qualitative and quantitative for atmospheres with

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radiological contaminants);

- Facial hair, contact lenses, and eye and face protection devices;
- Respiratory usability (insurance of respirator integrity);
- Respiratory inspection;
- Respirator use (monitoring of respiratory use);
- Respiratory hazards (monitoring of respirator hazards);
- Medical and bioassay surveillance; and
- Respirator maintenance.

EG&G has implemented a Respiratory Protection Program through Procedure 1-62200-HSP-7.03, *Respiratory Protection*. This practice defines the programmatic, monitoring, surveillance, maintenance, and general use requirements for respiratory protection.

Subcontractors may elect to utilize their own respiratory protection program. Prior to use of respiratory protection at RFP, the Subcontractor shall submit their program to the IH Department Respiratory Protection Program Administrator for review and approval. The approved program shall be included in the HASP. Subcontractors who do not elect to use their own Respiratory Protection Program shall comply with requirements stipulated in Procedure 1-62200-HSP-7.03.

Figure 6-1

THRESHOLD LIMIT VALUES FOR NOISE

<u>Duration Per Day</u> <u>Hours</u>	<u>Sound Level</u> <u>dBA*</u>
16	80
8	85
4	90
2	95
1	100
1/2	105
1/4	110
1/8	115**

-
- Sound level in decibels are measured on a sound meter, conforming as a minimum to the requirements of the American National Standards Specification for Sound Level Meters, S1.4 (1971 Type S2A and set to use the A-weighted network with slow meter response).

** No exposure to continuous or intermittent in excess of 115 dBA.

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CHAPTER 7

EMERGENCY RESPONSE

7.0 Introduction

A site-specific emergency response plan that explains how emergencies will be handled must be developed for each HASP. The OSHA requirements for site emergency response plans are identified in 29 CFR 1910.120 (I) [see Appendix B]. The ERPD and EPM emergency response plans should incorporate applicable elements from the *Rocky Flats Emergency Plan* and the *RCRA Contingency Plan* to provide a comprehensive site response plan. Emergency response for the RFP is conducted in accordance with Procedure 1-15200-EP-01.00, *Rocky Flats Plant Emergency Plan*. Classification of emergencies and integrated response requirements are detailed in the RFP Emergency Plan. Project-Specific HASPs are required to address site-specific, localized emergencies that are likely to occur as part of field activities. Crucial interfaces are detailed in the Boilerplate [Appendix C, Section 8.0].

7.1 Purpose

Emergency procedures are intended to minimize the impact of an emergency situation on the health and safety of personnel and on property at remedial project work sites. These procedures, which are to be an integral part of the HASP, shall identify manpower and equipment available for site-specific fire, medical, spills, and evacuation emergencies as well as the specific actions to be followed when responding to accidents and injuries.

Rehearsals of the HASP's emergency response procedures shall be conducted and documented as part of the training program for site operations. The responders and key personnel affected by these procedures shall provide written comments of the effectiveness of the response procedures after each training exercise. This information shall be used by the PM, the HSSC,

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and the ERHSO to evaluate and modify the emergency response program.

7.2 Key Personnel

The names and phone numbers of key personnel at ER remedial project sites with the authority and training to respond to accidents and emergencies must be provided in the HASP and posted on site so that they are readily accessible to site workers. Key site personnel to be contacted in the event of an emergency are the PM, the SHSC, the Subcontractor Field PM, and Subcontractor SSO.

Other important RFP emergency contacts include the:

- EMT/Ambulance; (966-2911)
- Fire Department; (966-2911)
- Security Personnel; (966-2911)
- Shift Superintendent; and (966-2914)
- Radio Notification. (Channel #1)

The Incident Commander (IC) for RFP is the Shift Superintendent on duty. The IC responds to all emergencies and is responsible for the implementation and coordination of the RFP Contingency Plan. The IC is responsible for determining the extent of the emergency, assessing hazards to human health and environment, and coordinating emergency response activities. The IC will activate the Emergency Operations Center (EOC), notify departments that have an advisory role in the situation, and determine if additional help from off-site agencies (police, medical, etc.) is required.

The IC will also notify any of the following departments when necessary:

- Radiological Engineering (RE),

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- Industrial Hygiene (IH),
- Occupational Safety (OS),
- Waste Operations (WO),
- Environmental Operations Management (EOM),
- Waste Programs (WP),
- Traffic,
- Radiological Operations (RO), and
- Occurrence Notification (ON).

The RE and IH Departments will assess any hazards associated with the release of spilled material. The RFP Hazardous Materials (HAZMAT) Team will respond to, contain, and mitigate hazardous material spills or releases. Information regarding the HAZMAT Team may be obtained by contacting the Fire Chief at 966-6043. Waste Programs will evaluate the incident for regulatory agency reporting requirements such as those required by the Resource Conservation and Recovery Act (RCRA), the Superfund Amendments and Reauthorization Act (SARA) Title III, and the IAG. In the event of a spill, notification must also be made to the EOM Occurrence Reporting Coordinator at 966-8587.

7.3 Medical Emergency Response Procedures

Medical emergency response requirements are detailed in Procedure HSP-4.02, *Emergency Medical Response*. Emergency medical assistance is available on plant site 7 days a week, 24 hours per day by calling 966-2911. In the event of a site emergency, response may be limited to the Emergency Medical Technician (EMT) notification and initial patient stabilization should be the roles played by site personnel. Upon arrival at the scene, the EMT will assess the incident and, as needed, will directly make contact with the Denver Metropolitan Emergency Medical Communications System (set up in Saint Anthony's Hospital North) for medical facility information. Patient transportation to a medical facility will be made on a case by case basis and depending on the severity of injuries.

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At a minimum, one site safety individual is required to have completed training in bloodborne pathogens as stated in 29 CFR 1910.1030 and to be a current card holder for the Red Cross First-Aid and Adult Cardiopulmonary Resuscitation (CPR) courses. The texts provided for the Red Cross course shall be kept in the site manager's office for use as reference. A minimum of one site safety individual shall be present at all times during work conducted in the EXCLUSION ZONE or the CONTAMINATED REDUCTION ZONE.

The following list provides an example of medical emergencies that should be planned for:

- Fractures, dislocations, sprains, and strains;
- Severe bleeding, cuts, scrapes, and bites;
- Temperature extreme disorders;
- Seizures;
- Diabetic emergencies;
- Poisoning;
- Poisonous insect and snake bites;
- Burns, including fire and chemical;
- Shock;
- Skin or eye injuries that would require immediate flushing or showering; and
- Symptoms of overexposure to hazardous substances.

The designation of where the ill/injured person is to be transported and the mode of transportation are to be clearly identified in the HASP.

7.3.1 Emergency Decontamination

When an injured person is contaminated, a decision will be required to give priority to first aid or decontamination. As outlined in Procedure HSP-4.02, *Emergency Medical Response*, the EMT responding to the incident will make the decision as to the type of transportation and to where

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the patient is to be transported. The on-call physician will be contacted on all emergencies expected to require off-site treatment. If the injury requires transport without decontamination and the on-call physician has not been reached, the Shift Superintendent is responsible for authorizing the patient transport.

The RO, RE, and IH Departments will assist in monitoring contamination levels and directing the procedures to follow for contamination control. If the condition of the patient is life-threatening (e.g., a heart attack), first aid actions will take priority over decontamination unless the contamination would harm response personnel. The *Decision Aid for Emergency Decontamination Diagram* [Figure 7-1] should be used to assist in making this decision.

7.4 Fire Response Procedures

The actions to be taken when a fire occurs at an ER remedial project work site shall be identified in the HASP to provide the workers with guidance. In all cases, the Fire Department shall be notified at 966-2911.

Small, localized fires shall be handled using the appropriate fire extinguisher to bring the occurrence under control. Fire extinguishers are to be used by trained personnel only. Uncontrolled fires shall be handled by the Fire Department. Workers shall call 966-2911, then evacuate the area. Workers shall call from the ER site only when it is safe to do so. If the situation is life-threatening, evacuate to a safe location, and then notify the Fire Department. And if there is a potential for the release of toxic gases, all persons in the immediate vicinity shall be evacuated and the Fire Department shall be notified.

7.5 Spill Response Procedures

HASP spill response procedures are to be limited to incidental or emergency initial response activity. These procedures involve response to incidental releases. Spills that require

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evacuation and additional emergency response support are considered non-incidental. Action is to be promptly taken to minimize any hazards to human health and the environment.

A **release** is any spilling, leaking, pumping, pouring, emitting, emptying, discharging, or dumping in any building/containment or to the environment. A **release requiring an emergency response** involves an effort by EG&G employees from outside the immediate release area or by other designated responders (e.g., HAZMAT Team) to an occurrence that results, or is likely to result, in an uncontrolled release of a hazardous substance (or unknown substance).

An **incidental release** includes:

- leaks;
- spills;
- other releases where the substance can be safely absorbed, neutralized, or otherwise controlled by personnel in the immediate release area at the time of the release as determined by the SSO/HSS; or
- releases of hazardous substances for which there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) above the normal operating conditions in the work area.

NOTE: Use of additional PPE (e.g., chemical cartridge respirators) not used during normal work activities or covered in the HASP is not allowed.

Personnel shall notify the SSO or Field Supervisor in the event of an incidental release. The Field Supervisor shall make the determination for further actions outside the initial response.

Releases reportable to the Shift Superintendent and the Occurrence Notification Center (ONC) include all solid and liquid releases of a hazardous material (including oil), a hazardous

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substance (including hazardous waste and radionuclides), or a non-hazardous substance (e.g., water) containing a hazardous constituent greater than or equal to one pound (or one pint for aqueous liquids) and all gaseous release that threaten or occur inside or outside any building/containment and that are unplanned. Any release from a RCRA regulated tank system is reportable if the release is not cleaned up within 24 hours of discovery. A release less than one pound is reportable if it has or will impact the environment (i.e., air, soil, or surface water). A release of non-hazardous substance that becomes contaminated due to the location of the release is reportable if it reaches the environment (e.g., sanitary or storm drain).

Personnel responding to incidental releases must be appropriately trained and must have completed the following:

- Building Indoctrination;
- Respirator Protection Certification;
- Hazard Communication Training; and
- Hazardous Waste Site Worker Training as specified in Procedure 1-62200-HSP-21.03.

NOTE: All spills or releases must be reported immediately to supervision.

For non-incidental or emergency spills, notify the Shift Superintendent at 966-2914. If it is a life threatening situation, call the RFP Emergency Number 966-2911 and evacuate the spill area. Assist the RFP Emergency Response Organization (ERO) as per their direction.

Clarification of the initial response actions may be obtained from the PM or the Environmental Coordinator (EC). The PM and EC contacts may be obtained from the ERHSO. Spill and/or release reporting requirements are detailed in Procedure 1-C49-HWRM-04, *Release Response and Reporting*.

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7.6 Notification and Reporting

The employee discovering an emergency is responsible for immediately reporting the situation, by the most expeditious means available (to RFP Emergency at 966-2911), then to the person in charge at the ER remedial project site. On-site communication must be listed in the HASP. If phones are not available on-site, radio contact must be maintained with someone who could report an accident immediately. One or more telephones, portable radios, or alarm devices must be available on each ER site.

ERPD representatives involved in emergency response include the PM and the SSO.

Subcontractor representatives responsible for responding to emergencies at their sites include the SSO and Field Supervisor. During an emergency, any individual who responds to the scene will have Incident Command Training (as provided by PBT) to be able to work and coordinate with the ERO. For this reason, emergency response should be left to appropriate EG&G organizations, whenever possible.

When reporting an emergency, provide as much detail as possible. Clearly state:

- Exact location of the emergency;
- Nature of the emergency;
- Condition of patient if applicable (breathing, consciousness, bleeding, etc.);
- Special hazards in the area;
- Your name;
- Your location; and
- Any other information requested.

When reporting vehicle or property damage, DOE Order 5484.1, *Environmental Protection, Safety, and Health Protection Information Reporting Requirements*, must be followed. This order includes requirements for reporting and recording occupational injuries or illness and

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vehicle or property damage. EG&G has implemented this DOE Order through Procedure 1-66100-HSP-3.03, *Reporting Occupational Injury or Illness and Vehicle or Property Damage*. All EG&G and Subcontractor personnel will comply with the requirements of this procedure. Following an event that is deemed reportable by Procedure 1-66100-HSP-3.03, the Supervisor or PM will initiate DOE Form 5484.X, *Individual Accident/Incident Report*, which can be found in Appendix 1 of Procedure 1-66100-HSP-3.03.

7.7 Evacuation Plan

The RFP has an established evacuation plan to be used by all employees and subcontractors. The Evacuation Plan consists of a set of procedures directing employees to a safe assembly area during an emergency to ensure their safety or to enhance the emergency response. Major emergencies that could threaten human health or the environment may require that an area, a building, or the entire plant be evacuated to a safe identified assembly area.

Emergency procedures for specific response actions not identified in the RFP Emergency Plan are to be prepared as part of the HASP. These procedures are to include the:

- Names and numbers of personnel to notify;
- Evacuation routes;
- Assembly areas; and
- Safety issues.

When evacuation of any part of the facility is called by the IC (Shift Superintendent), all employees, contractors, and visitors in that area will immediately leave the work area and proceed to a safe, identified assembly area. Rocky Flats personnel will be accounted for by their supervisors. A list of visiting personnel will be available from the site and building sign-in records. Generally, if personnel are downwind of the incident, they will evacuate perpendicular to the wind direction, and if they are upwind of the incident, they will evacuate in the upwind

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direction.

7.8 Emergency Equipment

Personal protective equipment (PPE) must be kept in reserve and maintained for emergency use. This equipment may be from the same stock that is used for daily operations, provided the portion of stock reserved for emergency use is not depleted. The emergency response decision requiring an upgrade in PPE will be left to the RFP ERO and/or the HAZMAT Team.

The following equipment shall be available for each ER project at the field location:

- First aid kits;
- Fire extinguishers (as approved by the Fire Department) and blankets;
- Eye wash bottles;
- Decontamination solutions appropriate for site hazards; and
- Any other appropriate spill response material.

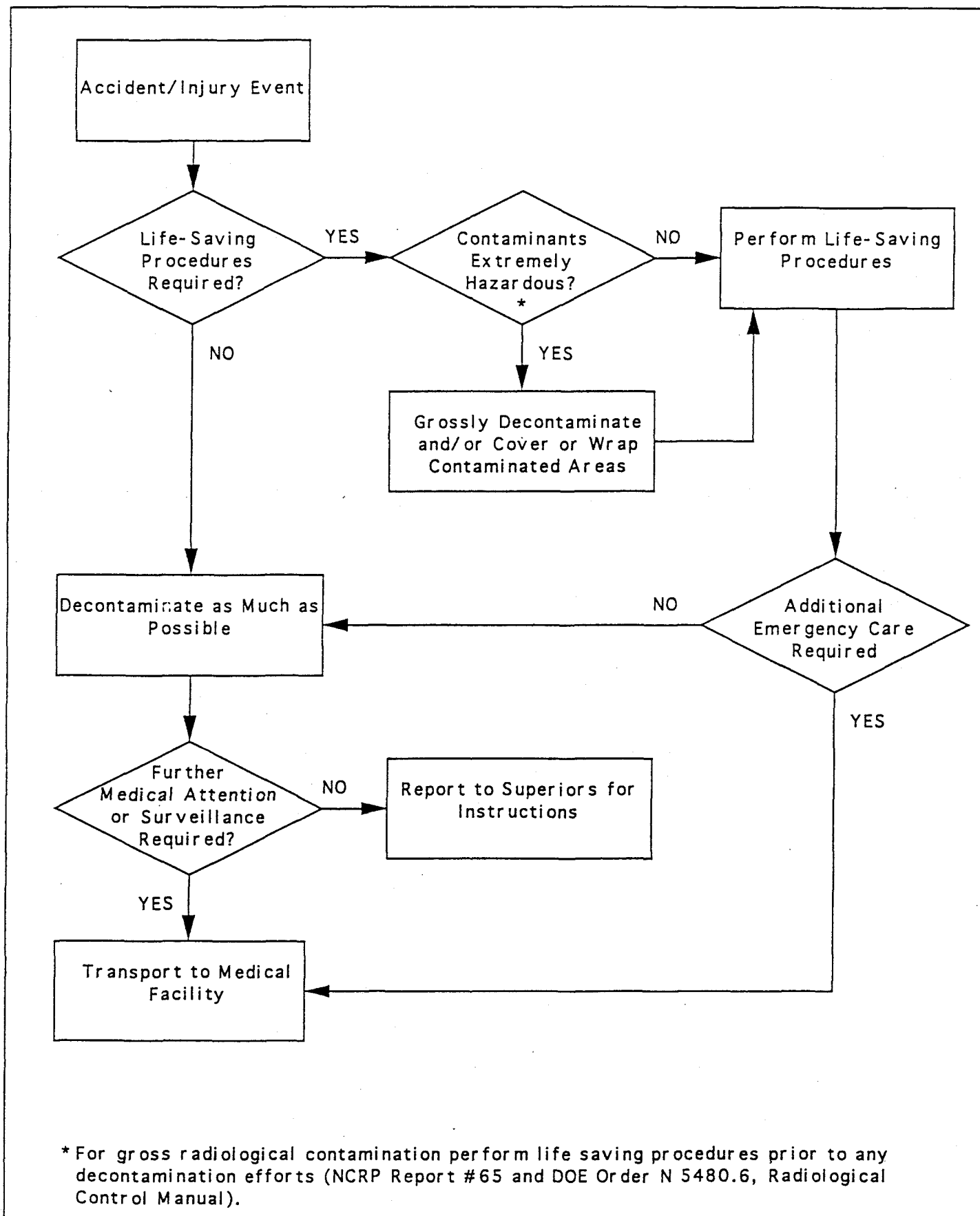
The Plan Workbook provides additional information on emergency equipment required. The emergency response equipment utilized and maintained by the HAZMAT Team is identified in the *Rocky Flats Fire Department Hazardous Materials Response Team Manual*. For specific information regarding the response capacity of the HAZMAT Team, contact the Fire Chief at 966-6043.

7.9 Alarms

All site personnel will be trained to immediately recognize RFP and ER site alarms. Standard alarm signals must be documented in each HASP. Subcontractors can call 966-7541 to listen to a recording of RFP alarm signals and the significance of each. Procedure 1-25600-HSP-20.01, *Access to and Use of the Rocky Flats Buffer Zone*, details communication requirements and alarm response for ER activities within the Buffer Zone.

Figure 7-1

Decision Aid for Emergency Decontamination



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CHAPTER 1

INTRODUCTION

1.0 Overview

The purpose of the Environmental Restoration Health and Safety Plan Workbook (Plan Workbook) is to assist EG&G and its subcontractors in the development, preparation, approval and implementation of HASPs. A logical progression is outlined which allows the reader to readily assimilate the specific information required for the HASP. The guidance in the Plan Workbook should be used in conjunction with Appendix C, *Site Health and Safety Plan "Boilerplate" for RFP Environmental Restoration Projects* (the Boilerplate), to prepare the HASP required for work at remedial project work sites and tasks involving hazardous waste operations.

The Plan Workbook discusses the components required for a HASP, while the Boilerplate provides the format for presenting this information. The format of the Boilerplate incorporates the basic programmatic requirements as detailed in the Program Plan [Part 1] and the Plan Workbook [Part 2]. The order in which information is presented in the Boilerplate may differ from that of the Plan Workbook.

A HASP shall be prepared for each project conducted as part of environmental restoration, remediation, and tasks involving hazardous waste operations. Copies of the HASP shall be kept in the field office of each remedial project work site. Copies of applicable reference material as cited in the HASP, such as the *EG&G Health and Safety Practices Manual (HSP)* and applicable *Environmental Management Division (EMD) Operating Procedures*, shall also be kept on site at the field office. Any conflicts between reference material requirements shall be brought to the attention of the ER Project Manager (PM) for immediate resolution.



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By completing the Boilerplate, the minimum documentation necessary for compliance with health and safety regulatory standards, Rocky Flats Plant (RFP) Policies, Environmental Management (EM) Operating Procedures, and Department of Energy (DOE) Orders for work at hazardous waste sites is met. The Boilerplate may also be used to provide baseline information to supplement a more comprehensive format, when deemed necessary. The regulatory standards in 29 CFR 1910.120 outline the minimum required elements for a HASP.

1.1 General Information

This section provides introductory information concerning assigned tasks and provides a broad look at the work which will allow the reader to readily assimilate specific information required in the HASP. General information shall include:

- Site Description - Location of project, physical characteristics, site history, and contaminants of concern (COCs);
- Project Identification - Operable Unit Number, Construction Phase, RCRA Facility Investigation/Remedial Investigation Number of Phase, etc.;
- Project Duration - Approximate start and stop dates;
- Project History - A brief review of the pertinent information concerning the background of the work to be performed;
- Scope of Work - An outline of the task to be accomplished; and
- Hazard Assessment - Identification of the site, tasks to be performed, and task hazards.

1.2 Assignment of Responsibilities for Key Personnel

This section will identify key project personnel, the organizational structure, and support departments required to safely accomplish site tasks. In addition, this section shall include a brief description of the health and safety-related responsibilities of departments and/or individuals and their respective authorities. The Boilerplate designates and delineates the

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responsibilities of key project personnel, and Section 2.2 of the Program Plan [Part 1] contains information related to assignment of responsibilities of key project personnel.

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CHAPTER 2

HEALTH AND SAFETY HAZARD ASSESSMENT

2.0 Overview

The following sections provide a systematic approach to safety and health assessments for activities at remedial project work sites and tasks involving hazardous waste operations.

2.1 Task Identification

Tasks designated in the Project Work Plan must be identified in the HASP. This identification is the initial step in addressing the type and nature of the exposure hazards each employee may encounter based upon task performed. Guidance provided in the Boilerplate as to task analysis and hazard identification are helpful. All tasks conducted at the site or as part of the project which involve the exposure or potential exposure to hazardous waste must be identified in the HASP.

2.2 Chemical Hazard Identification

Known or suspected contaminants at remedial project work sites and field laboratories which present a potential hazard to workers shall be identified. Any additional information available concerning the source and concentration are helpful data in the evaluation of potential exposure. Chemical hazard information, such as the *National Institute for Occupational Safety and Health (NIOSH) Pocket Guides to Chemical Hazards*, should be consulted for chemical hazards.

This document provides valuable information such as the:

- Applicable exposure limits of the chemical; symptoms of acute exposure;

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- Organs affected by exposure;
- Recommended personal protective equipment (PPE) that should be used when working around the chemical;
- Recommended first aid for exposure; and
- Physical characteristics of the chemical.

This information will be used to estimate the potential for worker exposure to the chemical for each task previously defined.

The Occupational Safety and Health Administration (OSHA) *Hazardous Waste Operations and Emergency Response* Standard, 29 CFR 1910.120 (c)(7), requires that the risk identification include Permissible Exposure Limits (PELs), NIOSH Recommended Exposure Limits (RELs), and if there are no RELs or PELs, American Conference on Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs). Applicable exposure limits shall be clearly stated in the HASP with associated action levels, and approved by Industrial Hygiene (IH). The HASP shall also detail routes of exposure, toxicological characteristics, carcinogenicity, potential for skin absorption, immediately dangerous to life and health (IDLH) concentrations, and any characteristics regarding flammability and reactivity, as applicable, for the contaminant of concern.

Information shall be available to site personnel for chemicals identified at the remedial project work site and field laboratories. This also applies to process chemicals (known to be stored or in use at the RFP facilities) that are proximate to remedial work site activities and present a potential hazard to site personnel. All chemicals shall be identified in the HASP and the potential for an exposure resulting from an accidental release evaluated. Information concerning the source and typical concentration of the chemicals in use can be obtained from the RFP Hazard Communication Program. Copies of the Material Safety Data Sheets (MSDS) and all pertinent Hazard Communication Program information concerning these chemicals shall be available at the work site.

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2.3. Biological Hazard Identification

Biological hazards that may be present at the remedial project work site must be identified including the location or source of the hazard and the probable routes of entry. For example, considerations of biological hazards may be necessary when workers are required to enter remote or seldom visited locations and when working on or near sewage lines. The low-growing scrub oak stands of the Front Range are a common habitat of the tick. This parasitic insect is a carrier of a number of diseases including the sometimes fatal Rocky Mountain Spotted Fever. Poisonous snakes may also be present in these areas. Spiders, bees, and wasps can be a considerable hazard for those people with known allergic reactions to the venom. Site personnel sensitive to these insects shall notify the Site Safety Officer (SSO) or the Site Health and Safety Coordinator (SHSC).

2.4 Radiological Hazard Identification

A hazard assessment shall be performed for elements or compounds, (known or suspected to be at the work site) that are sources of ionizing radiation. Toxicological characteristics, routes of exposure, and other information (as described in Section 2.2 of this chapter) shall be included.

The risks associated with overexposure to ionizing radiation and/or radioactive particles vary with the type of radiation, mode of exposure (internal versus external), the associated quality factor, and the exposure duration and intensity (acute versus chronic). Uncontrolled, chronic (long-term) external exposure to low-level ionizing radiation may contribute to an increased risk of stochastic effects. Chronic levels at relatively high radiation exposure may increase the risk of mutagenic effects (genetic defects, leukemia, etc.). Acute (high, short-term), external exposure may cause non-stochastic effects (cataracts skin erythema, etc.), of which the severity is related to the total exposure. Acute effects from environmental restoration activities is not an expected or anticipated hazard.

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There are two types of potential radiological exposure from activities at project sites:

- Internal exposure from alpha and beta/gamma emissions; and
- External exposure from gamma, X-ray, and high energy beta emissions.

Radionuclides and their respective progeny at project sites have the potential for increasing both types of exposure above naturally occurring background radiation levels. The HASP shall contain sufficient information and guidance to limit the potential exposure to levels As Low As Reasonable Achievable (ALARA). A discussion of the ALARA philosophy and its implications to site activities shall be included in the HASP.

The primary route of exposure for ionizing radiation during environmental restoration activities is by inhalation of alpha-emitting particles. Air sampling shall be performed in occupied areas where, under typical conditions, an individual is likely to receive an annual intake of 2% or more of the specified Annual Limit of Intake (ALI) values as listed in 10 CFR Part, *Occupational Radiation Protection*, Section 835.403, *Area Monitoring*, Paragraph (a)(1) and in the *Radiological Control Manual*, Section 555 (2). This is equivalent to 40 Derived Air Concentration (DAC) hours exposure in one year and a Committed Effective Dose Equivalent (CEDE) of 100 millirems.

If air sampling is required on a project, 10 CFR Sections 835.401, *General Requirements*, 835.402, *Individual Monitoring*, and 835.403, *Area Monitoring*, should be consulted for the appropriate regulatory requirements. Air monitoring programs established in the HASP shall be reviewed and approved by the Radiological Engineering (RE) Department prior to implementation.

Resuspension of radioactive materials in soil media may present a potential airborne radioactivity exposure risk. This may occur as a result of high winds or mechanical disturbance of contaminants. For this reason, care must be taken to minimize resuspension and

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maximize dust suppression activities. Dust suppression guidance is provided in the *Final Plan for the Prevention of Contamination Dispersion Manual* and in Procedure 4-21000-OPS-FO.1, *Air Monitoring and Dust Control*.

2.5 Physical Hazard Identification

A review of the planned field activities shall be made to identify physical hazards. The review shall inventory tasks which introduce a potential safety hazards and the associated mitigation of those hazards. A thorough review of the Project Work Plan, site maps, previous reports, as-built drawings, physical site walk-downs, and identified tasks provides valuable indicators as to potential physical hazards. It is essential to identify physical hazards in that accidents involving physical safety can directly injure workers and create the potential for additional hazards.

These secondary hazards may be exposure to extreme environments, contamination of wounds, cuts, or abrasions, and an increase in personal contamination due to damaged PPE. Operations at remedial project work sites exhibit a unique variety of potential hazards that must be sufficiently addressed in the HASP.

Tasks that exhibit potential physical hazards must be identified in the HASP. Section 2.1, *Task Analysis*, in the Boilerplate provides a methodology for describing tasks and laying out the steps required to perform the task. Any task which may introduce chemical, radiological, biological, and/or physical hazards is included in the task analysis.

The following is a list of activities that may occur as part of the field activities. This list serves as an example and is by no means a comprehensive list because the task analysis conducted for each project will generate separate lists as well.

- Forklift operations;

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- Drill-rig operations;
- Movement and handling of drums;
- Removing underground tanks;
- Operating generators; and
- Construction to include excavation and trenching.

Examples of physical hazards that may be associated with field activities are:

- Fire hazards;
- Electrical hazards;
- Overhead hazards;
- Pressurized safety systems and vessels;
- Power sources;
- Slip/trip/fall hazards;
- Compressed gases;
- Sharp objects;
- Heat stress; and
- Cold stress.

Following the identification of the task and the associated hazards, mitigation techniques or actions to minimize the hazards shall be established. This is accomplished by referencing Standard Operating Procedures (SOPs), Work Plans, Work Packages, or Job Safety Analysis, as appropriate. The approved documents must provide detailed steps required to perform the task with safety hold points identified. Table 2-2, Section 2-2.5, *Physical Hazards*, of the Boilerplate [Appendix C] lists physical hazards that may be encountered with the associated health and safety practices. If work controls are not documented or insufficient in regards to safety, SOPs or appropriate work control documents shall be developed which adequately address the above concerns.

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The *Health and Safety Practices (HSP) Manual, Chapter 12.00, Industrial Safety*, contains valuable information relative to RFP practices and policies on implementing OSHA regulations, DOE orders, and standard industrial safety practices.

2.6 Task-Specific Hazard Assessment

A hazard assessment shall be completed for each task identified in the HASP. The hazard analysis correlates the physical requirements of the task to each of the hazards identified. This allows for an estimate of the probability for exposure from the various hazards while the task is being performed. The hazard assessment is intended for use by qualified health and safety personnel in making decisions concerning the following:

- Administrative and engineering controls to be established for the task;
- Action levels for initiating engineering controls or PPE for the task;
- Proper PPE ensembles to be used once the action level is reached; and
- Appropriate site and personnel monitoring to ensure overexposure does not occur.

The Boilerplate is designed to aid in the decision logic associated with the control of chemical, biological, and radiological exposures.

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CHAPTER 3

TRAINING

3.0 Training Requirements

The training requirements for employees working at remedial project work sites must reflect the employee's job description, responsibilities, and site hazards. Training requirements appropriate to the employee's job description shall be assigned in the HASP. Training requirements are discussed in Chapter 4 of the Program Plan (reference Part 1 of this document). Additionally, training requirements are defined in the initial Readiness Review that is conducted for each project. Completion of training as required by the HASP must be documented and available for inspection. This will require maintaining copies of field personnel current training records at the field office.

Prior to obtaining access past the SUPPORT ZONE of a remedial project work site, the employee must meet the applicable training requirements contained in the HASP and provide proper documentation of this training to the SHSC or SSO, as appropriate. The SHSC or SSO shall verify the employee has completed the required training. In addition, the qualified Supervisor will document directly supervised field experience by signing the *Field Experience Checklist Form* [reference Figure 4-1 in Part 1], after the field experience requirement is met.

Documentation of Site-Specific Briefing and Daily/Weekly Tailgate Safety Meetings will be maintained at the remedial project work site. Copies of this training documentation shall be available for review.

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CHAPTER 4

PERSONAL PROTECTIVE EQUIPMENT

4.0 Personal Protective Equipment Requirements

OSHA Standard 29 CFR 1910.120 requires that any reasonable combination of engineering controls, work practices, and PPE shall be used to reduce employee exposure below the:

- Permissible Exposure Limit (PEL);
- Applicable ACGIH Threshold Limit Value (TLV);
- Applicable NIOSH Recommended Exposure Limit (REL); and
- Personal contamination and airborne radioactive material concentrations as specified in DOE Order N 5480.6, *Radiological Control Manual*, and 10 CFR 835, *Occupational Radiation Protection*.

As stated in 29 C FR 1910.134 (a), *Respiratory Protection, Permissible Practice*, the control of occupational exposure caused by breathing contaminated air shall be the primary objective to prevent atmospheric contamination. Exposure control shall be accomplished as far as feasible by accepted engineering control measures, and when effective engineering controls are not feasible, appropriate PPE (respiratory protection) shall be used.

An evaluation of the hazard assessment information for each task must be completed and summarized in the HASP to decide what administrative controls, engineering controls, and PPE will be used to protect workers. Assignment of specific action levels for the hazards must be made to ensure the timely implementation of engineering controls and PPE. The evaluation shall summarize the information relevant to the contaminant, routes of exposure, media content, published exposure limits, and the logic process that leads to the control methods and PPE selection. Included in the HASP shall be steps for the inspection of PPE prior to use for

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condition and integrity.

Assignment of protection levels and specific ensemble contents must be made for each task and be stated in the HASP. When establishing the controls required for worker protection, use the guidelines contained in the Boilerplate concerning selection of PPE. Selection of LEVEL D protection shall be used as minimum protection.

Additionally, mandatory selection of a particular level of protection is provided in 29 CFR 1910.120 for the following conditions:

- LEVEL A protection shall be selected if the chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either:
 - (1) Measured or the potential for high concentrations of atmospheric vapors, gasses, or particulate; or
 - (2) Site operations and work activities involving a high potential for splash, immersion, or exposure to IDLH conditions or unexpected vapors and/or gasses that are harmful to skin or capable of being absorbed through intact skin.
 - (3) Operations are being conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.
- LEVEL B protection shall be selected when:
 - (1) The type and concentration of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmospheres with IDLH concentrations of specific substances that present severe inhalation hazards and that do not represent a severe skin hazard or do not meet the criteria for use of air-purifying respirators;

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- (2) The atmospheres contains less than 19.5 percent oxygen; or
 - (3) The presence of incompletely identified vapors or gases is indicated by direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.
- LEVEL C protection shall be selected when the types of air contaminants have been identified, their concentrations measured, and when an air-purifying respirator is available that can safely and adequately remove the contaminants of concern. Consideration shall be made to ensure that liquid splashes, atmospheric contaminants, or other direct contact will not adversely affect or be absorbed through exposed skin.
 - LEVEL D protection shall be selected when no hazardous air pollutants are measured and work functions preclude splashes, immersion, contact, or potential for unexpected inhalation of any contamination of concern. Level D protection is primarily a work uniform and will be worn only in areas where the potential for exposure to toxic, corrosive, or asphyxiant substances do not occur.

Select PPE on the basis of the manufacturer's published performance characteristics. Consideration must be given to the limitations in protection provided by different PPE for each hazardous substance at remedial project work sites.

4.1 Respiratory Protection

A Respiratory Protection Program shall be included in the HASP. This may be accomplished by citing Procedure 1-62200-HSP-7.03, *Respiratory Protection*. Subcontractors may elect to utilize their own respiratory protection program. The program shall be submitted to the IH Respiratory Protection Program Administrator for review and approval prior to implementation. Respiratory protection is detailed in the Program Plan [Chapter 6, Section 6.10].

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CHAPTER 5

MEDICAL SURVEILLANCE

5.0 Medical Surveillance Requirements

The medical surveillance requirements shall be met for workers at remedial project work sites as defined in Chapter 5 of the Program Plan. The minimum acceptable medical surveillance requirements are detailed in Procedure 1-66000-HSP-4.09, *Physical Examinations*. These requirements include the following:

- Employees shall have baseline physical examinations prior to working at any remedial project work site and termination physical after completing work or employment with EG&G. The exam shall include a baseline bioassay for the assessment of pre-project radiological exposure.
- Employees considered to be "hazardous waste site workers" must be identified to the physician prior to the examination. In addition, the physician must be provided with:
 - A description of the employees duties as they relate to the employees exposure;
 - The employee's exposure levels or anticipated exposure levels;
 - A description of any personal protective equipment used or to be used; and
 - Information from previous medical examination of the employee which are not readily available to the examining physician.
- Employees must have periodic medical examinations every 12 months, or at a frequency determined to be appropriate (no greater than bi-annually) by Occupational Medicine (OM) or the examining physician.

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CHAPTER 6

SITE MONITORING

6.0 Site Monitoring Requirements

Site monitoring strategies shall be identified and established in the HASP. Monitoring will be performed when there is a potential for employee exposure to hazardous materials, environments, or conditions at remedial project work sites. Monitoring will assure that personnel exposures are maintained below "permissible or published" exposure limits and assure that engineering controls, work practices, and PPE are adequate for the tasks performed. Monitoring shall be conducted for environmental air sampling (ambient), for personal air sampling (breathing zone), for radiation exposure surveys as applicable, and for physical hazards to include noise, thermal, biological, and mechanical.

Monitoring provides valuable information concerning the initial assumptions of hazards exposure levels, the identification of the contaminants present, and the effectiveness of engineering controls. Contaminants and hazards of concern are identified and qualified through the health and safety hazards assessment process. A comprehensive description of the contamination of concern and hazards are to be included. By completing sections of the Boilerplate, a HASP that details a monitoring program can be generated.

As a minimum, the HASP site monitoring program shall address, as applicable, the following topics:

- IDLH atmospheres;
- Combustible and explosive atmospheres;
- Toxic and hazardous substances;
- Oxygen deficient atmospheres;

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- Thermal, noise, biological, and mechanical hazards;
- Radioactive surface contamination; and
- External radiation exposure.

6.1 Monitoring Strategy

The HASP shall clearly define the monitoring requirements for the identified contaminants of concern (COCs). Permissible exposure limits with action levels for each COC are to be listed. Air monitoring requirements, such as identifying and quantifying airborne concentrations of COCs for the environment and site personnel (breathing zone), are a minimum requirement to be included in the HASP. Monitoring strategies for chemical, noise, and thermal (as appropriate) hazards shall be developed so that real time detection capabilities are available to site safety personnel. The selection of monitoring equipment shall be clearly stated in the HASP.

Contamination control levels for radiological materials as specified in Procedure 1-16100-HSP-18.10, *Release of Property/Waste for Conditional and Unrestricted Release*, shall be clearly stated and reflect the level of engineering and administrative controls present. Programmatic, monitoring frequency, and instrumentation requirements for airborne radioactive material shall reflect DOE Order N 5480.6, *Radiological Control Manual*. Procedure 4-61300-RIO-04.03, *Portable Low Volume Air Sampling*, provides technical guidance and requirements for air sampling methodology and equipment.

Radiation and contamination control survey frequency is determined by the RE Department in accordance with Procedure RA-0503, *Routine Radiation and Contamination Survey Frequency*. Site safety personnel (SSO/HSS) shall visually observe site conditions, operations, and activities for potential atmosphere changes and the development of dangerous environments.

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6.2 Initial and Periodic Monitoring

Initial monitoring requirements for the work site and personnel shall be defined in the HASP.

The monitoring shall include, as appropriate:

- IDLH and oxygen deficient atmospheres;
- Monitoring to ensure personnel exposure is below permissible exposure limits or published exposure limits, as listed in the HASP;
- Monitoring for flammable and explosive atmospheres; and
- Nuisance dust and thermal, noise, and mechanical hazards.

Initial monitoring requirements and methodology, action levels, and decision logic shall be reviewed and approved by the RE and IH Departments prior to implementation. An example of action levels for exposure monitoring activities are shown in Table 6-1. As a minimum, a periodic monitoring program shall be defined in the HASP to include (as applicable) the following:

- Ability to identify a change in exposure levels;
- Movement of activities to a different location at the site;
- Response and actions taken in response to the introduction or identification of new contaminants or hazards;
- Different type of operations/activities;
- Handling and movement of leaking or ruptured drums; and
- Activities involving spill response.

The HASP shall define startup and regular site inspection requirements for mechanical hazards related to construction activities. Inspections are to be conducted by the Occupational Safety (OS) and Construction Safety (CS) Departments as required by the HSP Manual, Chapter 12, *Industrial Safety*.

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6.3 Calibration and Maintenance

The HASP shall clearly define the methods and requirements for calibration and maintenance of health and safety monitoring instrumentation. Calibration and maintenance methods and requirements shall be reviewed and approved by the IH and RE Departments.

Table 6-1
ACTION LEVELS FOR MONITORING ACTIVITIES

CONDITION	ACTION LEVEL	RESPONSE
• Explosive Atmosphere (non-confined space)	<10% LEL	Continue investigation.
	10% - 20% LEL	Continue on-site monitoring with extreme care.
	>20% LEL	Explosion hazard. Eliminate ignition sources. Withdraw from area immediately.
• Oxygen Deficiency	<19.5% O ₂	Monitor wearing SCBA or Supplied-Air Respirator. NOTE: Combustible gas readings may not be valid in atmospheres with <19.5% O ₂ .
	19.5% - 23.5% O ₂	Continue investigation with caution. O ₂ levels >21% require extreme caution; levels other than normal may be due to the presence of other substances.
	> 23.5% O ₂	Fire hazard potential. Stop work and consult with SHSC.
• Radiation Dose Rate	> 3 time background	Radiation above background levels signifies possible source(s) of radiation present.
	> 0.5 mrem/hr	Continue investigation with caution.
	> 5.0 mrem/hr	Potential radiation hazard. Post areas as a Radiation Area and notify Radiological Engineering.
	Airborne Radionuclides > 10% of DAC	Post area as AIRBORNE RADIOACTIVITY AREA. Provide appropriate respiratory protection (as a minimum HEPS Filter, Full-Face Respirators).
• Noise	> 85 dBA TWA, A-Scale	Monitor occupied area and personal area.
	> 140 dBA Implus, A-Scale	Institute engineering controls and/or provide hearing protection if levels exceeds 140 dBA.
• Organic or Inorganic Gases and Vapors	*10 % PEL	SSO consult chemical Data Sheets or Standard Manuals for air concentrations/toxicity data.
	*Lower Explosive Limit (LEL)	*Action levels depend on actual PEL/TLV/REL as defined in the HASP. Response actions to measured air concentration/toxicity levels shall be clearly defined as to appropriate implementation of engineering controls/work practices/respiratory protection.

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CHAPTER 7

SITE CONTROL

7.0 Site Control Program

Site control measures are necessary to control employee and general public (including untrained employees) exposures to the hazardous materials present at remedial project work sites. Section 6.0, *Site Control Measures*, of the Boilerplate provides additional information on site control methods.

7.1 Map of the Remedial Project Work Site

A map of the remedial project work site showing the current location of control boundaries must be included in the HASP. The map shall give the locations of evacuation routes, first aid stations, communication facilities, areas of safe refuge, sanitary facilities, and other support facilities.

7.2 Buddy System

All activities past the SUPPORT ZONE (SZ) (i.e., within the CONTAMINATION REDUCTION ZONE or EXCLUSION ZONE) shall be conducted using the "buddy system." When ALARA calls for only one person to perform a task, the "buddy" may not necessarily be required to enter the area. In all conditions, the "buddy" shall be able to:

- Provide his/her partner with prompt assistance;
- Observe his/her partner for signs of chemical or heat exposure;
- Periodically check the integrity of his/her partners protective clothing; and
- Notify the SHSC or another if emergency help is needed.

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Procedure 1-62200-HSP-21.03, *Hazardous Waste Operations*, provides a definition of the "buddy system."

7.3 Site Communications

Effective communications dramatically increase the efficiency of site operations.

Communication systems should be established providing internal communications to workers at remedial project work site and external communications to employees off the site.

When selecting the internal communication system, the following points should be considered:

- Verbal communication at the work sites will likely be impeded by high background noise, specially when workers are required to wear respiratory protection. Development of both audio and visual communication signals will mitigate some of these problems.
- Workers will appear similar when wearing protective clothing. Color coded markings and name tags (front and back) are recommended and can help to prevent confusion among site personnel, but are not mandatory.
- Some communication devices may not be suitable for use in potentially explosive atmospheres.

Before an external communications system may be used on the RFP plantsite, the equipment must be checked and approved by the Communications Systems Department and the Technical Security Department.

Procedure 1-25600-HSP-20.09, *Access to and Use of the Rocky Flats Plant Buffer Zone*, defines communication requirements for remedial work site in the buffer zone.

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7.4 Site Work Zones

The following definitions shall be used for remedial project site chemical work zones:

- EXCLUSION ZONE (EZ) - The contaminated area.
- HOT LINE - The outer boundary of the EZ.
- CONTAMINATION REDUCTION ZONE (CRZ) - A buffer area to prevent casual access to the EZ.
- CONTAMINATION CONTROL LINE - The outer boundary of the CRZ.
- SUPPORT ZONE (SZ) - The uncontaminated area surrounding the CRZ where workers are not exposed to hazardous conditions.
- DECONTAMINATION CORRIDOR - Area providing access and egress from the EZ to the CRZ; also, the area where decontamination takes place.
- CONTROL POINT - Stations at the ends of the DECONTAMINATION CORRIDOR providing access to and egress from the EZ to the CRZ.
- CONTROLLED AREA - All points within the CONTAMINATION CONTROL LINE.

The posting of zones, with respect to radiological contaminants, is based on the directives contained in DOE Order N 5480.6, *Radiological Control Manual*. Radiological posting requirements are established in Procedure HSP-18.03, *Radiological Protection Signs, Labels, and Tags*. Field guidance is provided in Procedure 3-21000-OPS-EMRG 1.3, *Posting of Radiation Protection Requirements*, and in Procedure ROI-1.3, *Posting of Radiation Protection Requirements*.

7.5 Placement of Boundaries

Boundaries, for the different control zones, shall be constructed of construction security fencing, snow fencing, or barrier ribbon, depending on the degree of security required for the zones and the ease of access to the area.

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When designating the location of the HOT LINE, a visual survey of the remedial project work site should be conducted to determine the:

- Location of the contaminated material derived from a review of the site-specific data;
- Distances necessary to prevent contamination spread during performance of tasks;
- Location and distances required for safe refuge or area evacuation;
- Area required for site operations;
- Prevailing wind direction; and
- Probable meteorological conditions.

Once the HOT LINE has been established, modification of its location may be required as conditions change. Any required changes to the HOT LINE shall be approved by the SSO. Access control points shall be established at both ends of the DECONTAMINATION CORRIDOR to control the flow of personnel and equipment into and out of the work area. *Hazardous Material Access Logs* shall be maintained in the SZ for all employees that enter the EZ. An example of the boundary design is given in Diagram 7-1. The exact configuration of the site control boundaries may change for each task performed. The SSO/HSS is responsible for:

- Ensuring that the boundaries are all posted clearly;
- Communicating the entry requirements for the control zones to all personnel at the site;
- And maintaining the *Hazardous Materials Access Log* (Site Access Log).

7.6 Posting

All zones must be conspicuously delineated. The extent of posting (e.g., tape, permanent signs, etc.) for each site will be based on the severity of the hazards associated with the site. Posting requirements may include chemical warnings, radiological warnings, and PPE requirements. Guidance on posting requirements for chemical and physical hazards may be obtained from the Industrial Hygiene (IH) and Occupational Safety (OS) Departments. Radiological posting

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requirements are established in Procedure HSP-18.03, *Radiological Protection Signs, Labels, and Tags*. Field guidance for radiological posting are provided in Procedure 3-21000-OPS-EMRG 1.3, *Posting of Radiation Protection Requirements*, and in Procedure ROI 1.3, *Posting of Radiation Protection Requirements*.

7.7 Site Security

Physical barriers shall be erected to prevent the exposure of unauthorized and/or unprotected personnel to the hazards on the site. Guidance for barriers and posting is provided in Procedure 1-62300-HSP-10.01, *Physical Hazards, Barricades, and Accident Prevention Signs and Tags*. During working hours, site security shall be provided by the Field Supervisor. During off-hours work sites are also to be secured. The normal routine of the RFP Protective Force provides adequate security for the remedial project work sites.

7.8 Visitor Controls

All visitors to the remedial project site shall participate in a visitor briefing conducted by the SSO or SHSC, as appropriate. Visitors shall be cautioned to avoid skin contact with contaminated or potentially contaminated surfaces and to stay outside of the CRZ and EZ. Visitor access past the SZ must be cleared by the ERHSO. Visitors requesting to enter the controlled areas beyond the contamination control line, to observe work, shall be required to:

- Provide documentation of training required by the HASP;
- Complete medical surveillance requirements listed in Chapter 5 of the Program Plan and provide the information requested on Figure 5-1 and 5-2 of the Program Plan; and
- Comply with all the requirements of the Program Plan and the HASP.

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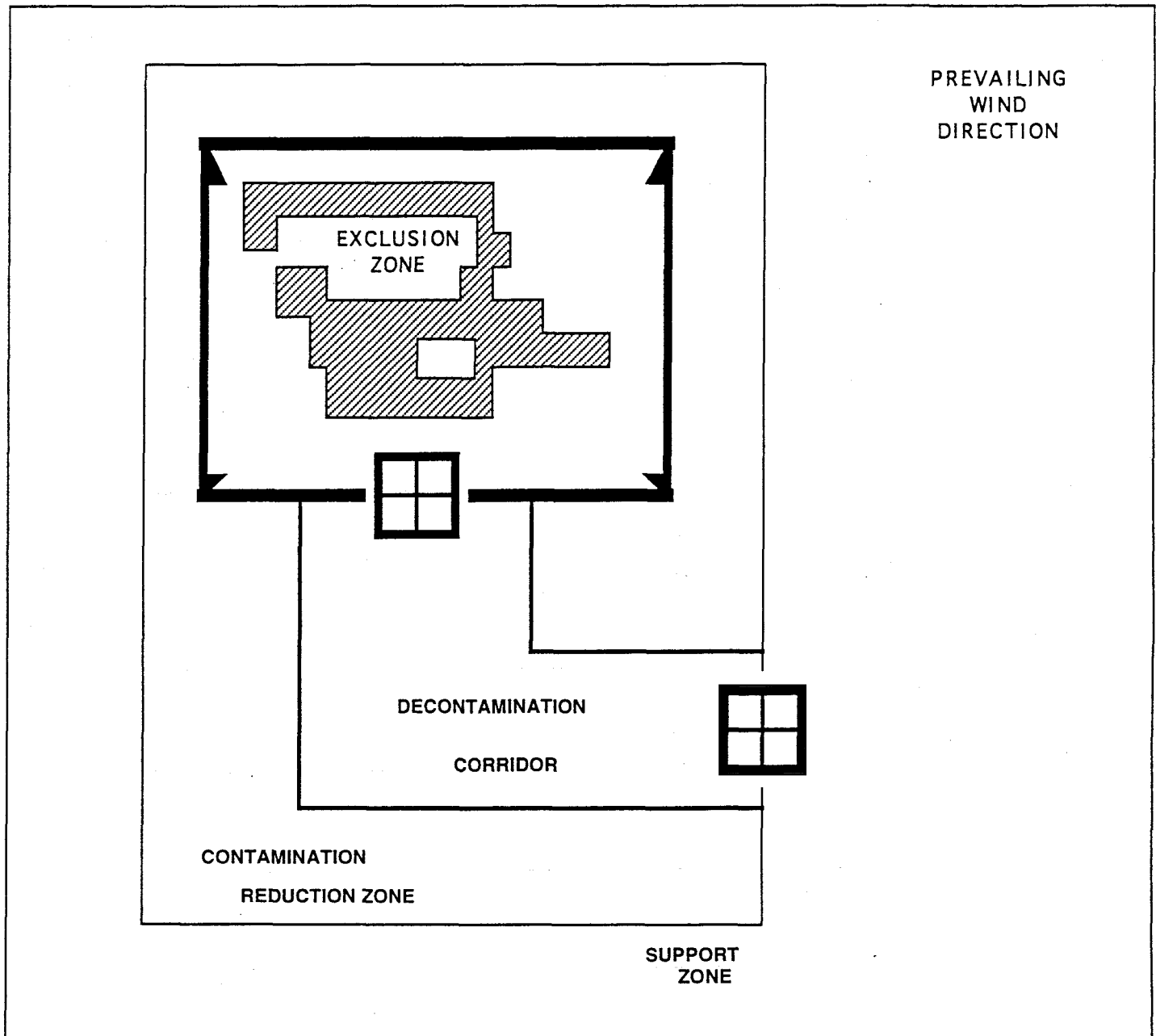
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7.9 Radiation Work Permit



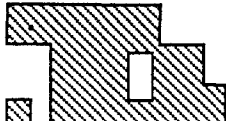
A Radiation Work Permit (RWP) is required for work in a Radiologically Controlled Area (RCA) or an area of known or suspected radiological contamination. The RWP is utilized for single-task and ongoing operations or site access, to ensure control of the worksite, to ensure compliance to procedural requirements, and for proper authorization of all radiological work. The requirements of the RWP program are detailed in Procedure HSP-6.07, *Radiation Work Permit*. The requirements of the RWP as applicable to the site will be delineated in the HASP.

Diagram 7-1



Area dimensions given are not to scale, distances between points can vary.

LEGEND:

-  ° ACCESS CONTROL POINTS
-  ° HOT LINE BOUNDARY
-  ° CONTAMINATED AREA

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CHAPTER 8

DECONTAMINATION

8.0 Decontamination Requirements

The objective of decontamination is to remove hazardous substances from workers and equipment, to assure compliance with DOE Order 5480.11 and OSHA Standard 29 CFR 1910.120, and to preclude the occurrence of potential adverse health effects that could be caused by contact with hazardous materials. Decontamination requirements and procedures at environmental restoration (ER) sites will vary according to the task being performed and the hazardous materials encountered. The following Environmental Management (EM) operating procedures, found in the *EM Operating Procedures Manual, Volume I: Field Operations* (Procedure Manual No. 4-11000-ER-OPS-FO), are applicable to ER decontamination activities:

- FO.03, *General Equipment Decontamination*;
- FO.04, *Heavy Equipment Decontamination*;
- FO.07, *Handling of Decontamination Water and Waste Water*;
- FO.06, *Handling of Personal Protective Equipment*; and
- FO.12, *Decontamination Facility Operations*.

Guidance is provided in Section 7.0 of the Boilerplate for defining the sequence of activities that will ensure both chemical and radiological decontamination are performed. Procedure HSP-18.02, *Personnel Contamination Control Requirements for Radiological Controlled Areas*, describes requirements for decontamination and shall be referenced for requirements.

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8.1 Personnel Decontamination

Personnel decontamination procedures used at remedial project work sites shall be provided to personnel who will be entering and exiting the EZ to the CRZ. Personnel will read through the step-by-step requirements and demonstrate understanding. Personnel shall review decontamination procedures detailed in the HASP and applicable EM Field Operation Procedures as listed in the previous section. Compliance with the step-off decontamination sequence will provide the final measures necessary to prevent worker exposure to the hazards present on the site. The step-off sequences contained in the HASP will allow the greatest amount of flexibility possible. However, deviation from the flow pattern is not allowed. Failure to complete all steps, in sequence, may result in the release of a hazardous contaminant into the SZ.

8.2 Radiological Decontamination

Personnel shall be monitored by a qualified Radiological Control Technician (RCT) or a Health and Safety Specialist (HSS), as appropriate, for radioactive contamination on their clothing and skin upon exiting any Radiologically Controlled Area (RCA) at a remedial project site. Skin contamination events require the notification and assistance of Radiological Engineering (RE). The RE Department will coordinate additional notifications and actions as required by the following procedures found in the *Radiological Operation Instruction (ROI) Manual*:

- Procedure ROI-2.1, *Personnel Decontamination Monitoring*;
- Procedure 4-61300-ROI-02.02, *Potential Inhalation Intakes*;
- Procedure 4-61300-ROI-02.03, *Wounds and Skin/Hair Contamination*;
- Procedure 4-61300-ROI-02.04, *Routine Workplace Nasal/Mouth Swab Samples*; and
- Procedure HSP-18.09, *Self-Monitoring*.

Notification must also be made to the ERHSO. Emergency showers and eyewashes will be located conveniently near any site where the potential for skin or eye exposure to contamination exist.

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8.3 Equipment Decontamination

Before removing any equipment from the CONTROLLED AREA may be contaminated with non-radioactive contaminants. Equipment shall be decontaminated or containerized accordingly. The field supervisor is responsible for ensuring that equipment leaving the site has been adequately decontaminated.

Equipment decontamination shall be conducted within the DECONTAMINATION CORRIDOR. Small equipment (such as hand implements and sample collection equipment) may be decontaminated at the personal protective equipment (PPE) decontamination stations. Large equipment (such as a loader, backhoe, or truck) will require more room and facilities for a high-pressure washer, collection of water run-off, and over-spray control. Equipment and material leaving a posted RCA or an area of potential radioactive contamination must be surveyed for release as required by DOE Order N5480.6, *Radiological Control Manual*. This requirement is EG&G implemented by Procedure 1-16100-HSP-18.10, *Release of Property/Waste for Conditional and Unrestricted Use*.

8.4 Personal Protective Equipment Decontamination

Personal protective garments worn within the EXCLUSION ZONE and the DECONTAMINATION CORRIDOR shall not be worn outside the CONTAMINATION CONTROL LINE. All site personnel shall follow the step-off decontamination sequence whenever they leave the remedial project work site. In addition, PPE is to be handled according to Procedure 4-1100-ER-OPS-FO.06, *Handling of Personal Protective Equipment*.

Used protective clothing being disposed of at the decontamination station shall be placed into suitable receptacles. Contaminated protective clothing shall not be removed from the decontamination area until it has been properly bagged and labeled. Polyethylene bags may be used for this purpose provided they are sealed daily.

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Adequate facilities for washing hands and face will be available at the decontamination station to meet the minimum sanitation requirements. Hands and face shall be washed prior to eating or drinking and before leaving the site at the end of each shift.

Requirements for showering will be stipulated in the HASP based upon the potential for contamination and the related task. Personnel shall shower at the facilities provided at the Contractor Yard or as specified in the HASP.

The stations listed for decontamination shall be set-up in the DECONTAMINATION CORRIDOR. Access to the decontamination area from the SUPPORT ZONE shall be controlled at an Access Control Point. The RCT or HSS, as appropriate, is responsible for ensuring that the steps of decontamination are carried out properly and that a *Hazardous Materials Access Log* is maintained at the field office to provide accurate documentation of the potential exposure time of workers and supervisors.

Mild soap solutions will usually be used for decontamination purposes. Decontamination water and/or soap solutions are to be properly labeled and disposed of as required by Procedure 4-1100-ER-OPS-FO.07, *Handling of Decontamination Water and Wash Water*. Storage or disposal of drums shall be determined by Environmental Operations Management (EOM). In the event that additional decontamination solutions are required for site operations, EOM will advise on the appropriate storage containers and disposal methods.

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CHAPTER 9

EMERGENCY RESPONSE

9.0 Emergency Response Plan

The emergency response plan is intended to provide coordination of first responses at the remediation project work site, with the appropriate Rocky Flats Plant (RFP) support. The delineation of emergency response as related to ER field projects is discussed in Section 8.0 of the Boilerplate and in Chapter 7 of the Program Plan.

9.1 Purpose

Emergency procedures minimize the impact of any emergency, or unusual occurrence, upon the health and safety of personnel at the remedial project work site. These procedures also identify the resources available to cope with industrial, radiological, chemical, and natural emergencies.

Specific actions for response to accidents and injuries, at the remedial project work site, are contained in this section. Information concerning reporting or responding to emergencies off of the remedial project work site are contained in the *Rocky Flats Emergency Response Plan*, as detailed in the Program Plan.

Rehearsals of the procedures contained in this section will be documented as part of the training program for site operations. The frequency and duration of the emergency response exercises shall be determined by the PM and the ERHSO based upon the hazards and duration of the project. This shall be documented in the HASP. The responders and key people affected by the use of this procedure shall provide written comments and a critique of the exercise's effectiveness. This information shall be used by the PM and the ERHSO to evaluate and modify this section.

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9.2 Key Personnel

The names and phone extensions for the key personnel at remedial project work sites, with the authority and training to respond to accidents and unusual conditions, must be posted and accessible to the workers. These personnel include the:

- EG&G Project Manager;
- Site Health and Safety Coordinator;
- Subcontractor Site Safety Officer; and
- Subcontractor Field Engineer/Supervisor.

The local responders at the Rocky Flats Plant, that are trained to respond to emergencies addressed in this section, shall be posted. They include:

- EMT/AMBULANCE; 966-2911
- FIRE; 966-2911
- POLICE/SECURITY; 966-2911
- SHIFT SUPERINTENDENT; and 966-2914
- RADIO NOTIFICATION. Channel #1

The succession of authority on the remedial project work site, for the "Person-in-Charge" until relieved by the RFP Emergency Response Team (HAZMAT Team), is as follows:

- First, the Subcontractor Field Engineer/Supervisor;
- Second, the Subcontractor Health and Safety Coordinator;
- Third, the Environmental Restoration Project Manager; and
- Fourth, the Site Health and Safety Coordinator.

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9.3 Medical Emergency Response Procedures

If an employee working in a contaminated area is physically injured, Red Cross First-Aid procedures will be followed. The SSO/HSS is required to complete Bloodborne Pathogen training as stated in 29 CFR 1910.1030, *Bloodborne Pathogens*, and to be a current card holder for the Red Cross First-Aid and Adult Cardiopulmonary Resuscitation (CPR) courses. A minimum of one such qualified individual must be present when field activities in the EZ and the CRZ are occurring. The texts provided for the Red Cross courses will be kept in the field office for reference.

The following list provides examples of the types of medical emergencies that should be planned for:

- Fractures, dislocations, sprains, and strains;
- Severe bleeding, cuts, scrapes, and bites;
- Temperature extremes disorders;
- Heart attacks and strokes;
- Seizures;
- Diabetic emergencies;
- Poisoning;
- Burns, including fire and chemical;
- Shock; and
- Snake/Insect Bites.

The steps to be taken by workers at the site, when a medical emergency occurs, will be identified to provide instructions for the worker from the time of the injury until the "Person-in-Charge" arrives on scene. In all cases, the Fire Department will be notified at 966-2911. Site workers shall obtain from the Fire Department the identification of additional notifications to be made and decisions for transporting injured personnel.

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9.4 Fire Response Procedures

The actions to be taken when a fire occurs at a remedial project work site shall be identified to provide the workers with guidance. In all cases, the Fire Department shall be notified at 966-2911. Site workers shall implement the following response procedures in the event of a fire:

- Small, localized fires shall be handled using the appropriate fire extinguisher, by trained personnel only, to bring the occurrence under control.
- Uncontrolled fires shall be handled by the Fire Department, site personnel should use the manual fire telephone station, call 966-2911, or notify the Fire Department on Radio Channel #1, then evacuate the area.
- If the fire releases potentially toxic gasses, all persons in the immediate vicinity shall be evacuated and the evacuation alarm activated. The Fire Department should then be informed of the toxic gasses.

9.5 Notification and Reporting

The employee who discovers the emergency is responsible for immediately reporting the situation, by the most expeditious means available, to the person in charge at the work site. To prepare the HASP, refer to the Program Plan, Section 7.6, *Notification and Reporting*. In the event of an emergency, an immediate notification to the Fire Department at 966-2911 will be made.

9.6 Equipment

In an emergency, equipment will be necessary to communicate with local responders, to rescue and treat victims, to protect response personnel, and to mitigate hazardous conditions on site. The HASP shall list the equipment that will be at the remedial project work site to be used for emergency response. The minimum equipment required for emergency response is:

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- Communication equipment:
 - Telephones (Cellular Phones); and
 - Portable radios.
- Personal protective equipment:
 - Personal protective equipment must be kept in reserve and maintained for emergency use.
 - This equipment may be from the same stock that is used for daily operations, provided the portion of stock reserved for emergency use is not depleted.
- Medical and fire safety equipment:
 - First aid kits; and
 - Fire extinguishers and blankets.

The following equipment is required at the field site and may be used by Emergency Response personnel:

- Fifteen (15) minute eye wash for work involving corrosive chemicals;
- Ten (10) gallons of water, in portable containers; and
- Decontamination solutions appropriate for the on-site hazards.

Additionally, recommended field communication devices are:

- Megaphone/Bullhorn devices; and
- Alarm devices (air-horns, sirens, whistles, etc.).

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9.7 Alarms

The method for emergency notification of personnel located at field sites must be stipulated in the HASP. Procedure 1-25600-HSP-20.01, *Access To and Use of the Rocky Flats Plant Buffer Zone*, details field communication requirements.

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CHAPTER 10

CONFINED SPACES

10.0 Confined Space Entry

Because of continued confined space problems and associated occupational fatalities, the Occupational Safety and Health Administration (OSHA) issued a final rule which tightened its confined space requirements for general industry. The new standard, *Permit-Required Confined Spaces*, found in Title 29 of the Code of Federal Regulations 1910.146 (29 CFR 1910.146), provides a comprehensive regulatory framework for employers to effectively protect employees who work in permit spaces.

OSHA's new standard sets safety requirements for entry into those confined spaces, designated as permit-required confined spaces, which pose special dangers for entrants because their configurations hamper efforts to protect entrants from serious hazards such as toxic, explosive, or asphyxiating atmospheres.

10.1 Standard Highlights

The following information⁸ presents some of the highlights of 29 CFR 1910.146:

- A **confined space** is defined as a space that:
 - (1) Is large enough and so configured that an employee can bodily enter and perform assigned work;
 - (2) Has limited or restricted means for entry or exit as identified in tanks, vessels,

⁸ For detailed information about confined space entry, see the EG&G Procedure 1-15310-HSP-6.04, *Confined Space Entry Program*.

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silos, storage bins, hoppers, vaults, and pits; and

(3) Is not designed for continuous employee occupancy.

- A **permit-required confined space** (permit space) is defined as a "confined space" that has one or more of the following characteristics:

- (1) Contains or has a potential to contain a hazardous atmosphere;
- (2) Contains a material that has the potential for engulfing an entrant;
- (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- (4) Contains any other recognized serious safety or health hazard.

- A **non-permit confined space** is a "confined space" that does not actually or potentially contain hazards that could cause death or serious physical harm. Examples of non-permit confined spaces include vented vaults, motor control cabinets, crawl spaces, and dropped ceilings. Although they are "confined spaces," these spaces have either natural or permanent mechanical ventilation to prevent the accumulation of a hazardous atmosphere, and they do not present engulfment or other serious hazards.
- A **prohibited condition** is defined as any condition not allowed by permit during entry operations.
- The term **engulfment** means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing. OSHA believes that this definition clearly indicates that any solid or liquid that can flow into a confined space and that can drown or suffocate an employee can be the engulfing medium.

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- The term **hazardous atmosphere** means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (escape unaided from a permit space), injury, or acute illness from one or more of the following causes:
 - (1) A flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL).
 - (2) An airborne combustible dust at a concentration that meets or exceeds its LFL.⁹
 - (3) An atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
 - (4) An atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, *Occupational Health and Environmental Control*, or in Subpart Z, *Toxic and Hazardous Substances*, of Part 1910 and which could result in employee exposure in excess of its dose or permissible exposure limit.¹⁰
 - (5) Or any other atmospheric condition that is immediately dangerous to life or health.¹¹
- The term **immediately dangerous to life or health (IDLH)** is defined as any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to

⁹ This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.

¹⁰ An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

¹¹ Air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Material Safety Data Sheets (MSDSs) that comply with the *Hazard Communication* Standard, 29 CFR 1910.1200, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

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escape unaided from a permit space.¹²

- The term **oxygen deficient atmosphere** is defined as an atmosphere containing less than 19.5 percent oxygen by volume. The 19.5 percent oxygen level is widely recognized as being the minimum level needed to ensure an adequate supply of oxygen. For example, the NIOSH Respirator Decision Logic utilizes 19.5 percent oxygen concentration as the decision level for use of a respirator, and the American National Standards Institute (ANSI) Z117.1 Standard itself recognizes this concentration as a minimum.
- The term **oxygen enriched atmosphere** is defined as an atmosphere containing more than 23.5 percent oxygen by volume. As noted earlier in reference to the definition of "hazardous atmosphere," the final rule has adopted a safe upper limit on oxygen content of 23.5 percent.
- The term **entry** refers to the act by which a person passes through an opening into a permit space and to the work performed in that space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.¹³

¹² OSHA has adopted a definition of "immediately dangerous to life or health" that is consistent with 29 CFR 1910.120. OSHA has also included a note that provides an example of a delayed health effect. The Agency stated that some materials (hydrogen fluoride gas and cadmium vapor, for example) may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

¹³ "Entry" under 29 CFR 1910.146 does not include entry into any confined space that does not pose a hazard to employees. Only entries into confined spaces that are permit-required confined spaces are covered.

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- The **evaluation** process requires employers initially to evaluate their workplaces and determine if there are any permit-required confined spaces, to inform employees through signs or other equally effective means, and to prevent unauthorized entry.
- The **permit-required confined space program** mandates a written program to prevent unauthorized entry, to identify and evaluate hazards, and to establish procedures and practices for safe entry including testing and monitoring conditions. This program calls for:
 - (1) An attendant stationed outside permit spaces during entry;
 - (2) Procedures to summon rescuers and prevent unauthorized personnel from attempting rescue;
 - (3) A system for preparing, issuing, using, and canceling entry permits;
 - (4) Coordination of entry for more than one employer;
 - (5) Procedures for concluding entry operations and canceling entry permits; and
 - (6) Review of the employer's permit program at least annually or as necessary.
- The **permit system** requires an entry supervisor to authorize entry, prepare and sign written permits, order corrective measures if necessary, and cancel permits when work is completed. The permit must be available to all employees and extend only for duration of the task. They must be retained for a year to facilitate review of the confined space program.
- The **permit** must include:
 - (1) Identification of space;
 - (2) Purpose of entry;
 - (3) Date and duration of permit;
 - (4) List of authorized entrants;

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- (5) Names of current attendants and entry supervisor;
- (6) List of hazards in the permit space; and
- (7) List of measures to isolate permit space and eliminate/control hazards.

Permit must also state the:

- (8) Acceptable entry conditions;
 - (9) Results of tests initiated by the person(s) performing tests;
 - (10) Rescue emergency services and means to summon;
 - (11) Communication procedures for attendants/entrants;
 - (12) Required equipment (such as respirators, communications, alarm, etc.);
 - (13) Any other necessary information; and
 - (14) Any additional permits (such as for hot work).
- The **training** of employees mandates initial confined space entry training to provide employees understanding, skills, and knowledge to do job safely. Refresher training is also to be given when duties change, hazards in space change, or whenever evaluation determines inadequacies in employee's knowledge.

Employers must certify that training has been conducted. The employer's certification of training must include the:

- (1) Employee's name;
 - (2) Signature or initials of trainer; and
 - (3) Date of training.
- All **authorized entrants** must:

- Know the hazards they may face;

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- Be able to recognize signs or symptoms of exposure;
 - Understand the consequences of exposure to hazards; and
 - Know how to use any needed equipment;
 - Know how to communicate with attendants as necessary;
 - Know how to alert attendants when a warning symptom or other hazardous condition exists; and
 - Know how to exit as quickly as possible whenever ordered or alerted (by alarm, warning sign, or prohibited condition) to do so.
- All **attendants** must:
 - Know hazards of confined spaces;
 - Be aware of behavioral effects of potential exposures;
 - Maintain continuous count/identification of authorized attendants;
 - Remain outside space until relieved; and
 - Communicate with entrants as necessary to monitor entrant status;
 - Monitor activities inside and outside the permit space; and
 - Order exit if required, summon rescuers if necessary, prevent unauthorized entry into confined space, and perform non-entry rescues if required.
- NOTE: Attendants may not perform other duties that interfere with their primary duty to monitor and to protect the safety of authorized entrants.**
- All **entry supervisors** (such as the employer, foreman, or crew chief) must:
 - Know hazards of confined spaces;
 - Verify that all tests have been conducted and all procedures and equipment are in place before endorsing permit, terminate entry, and cancel permits; and

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- Verify that rescue services are available and the means for summoning them are operable.

In addition, the entry supervisors are responsible for:

- Removing unauthorized individuals who enter confined space;
- Determining if acceptable entry conditions are present at a permit space where entry is planned;
- Authorizing entry and overseeing entry operations; and
- Terminating entry.

NOTE: An entry supervisor may also serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role he or she fills. All pertinent requirements relating to the duties of attendants and authorized entrants would still apply to the entry supervisor who serves as an attendant or an authorized entrant. Additionally, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

- The **rescue services** may be on-site or off-site. Rescue is to use employee retrieval systems whenever possible.

On-site teams must be properly equipped; receive the same training as authorized entrants plus training to use personal protective and rescue equipment and first aid training including CPR; and practice simulated rescues at least once every 12 months.

Outside rescue services must be made aware of hazards, receive access to comparable permit spaces to develop rescue plans, and practice rescues. Employer must provide

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hospitals or treatment facilities any MSDSs or other information on a permit space hazard exposure situation that may aid in treatment of rescued employees.

- The **contractor(s)** requirement calls for host employers to provide information to contractors on permit spaces, the permit space program, and procedures and likely hazards that the contractor might encounter. Joint entries must be coordinated and the contractor debriefed at the conclusion of entry operations.
- For permit spaces where the only hazard is atmospheric and where ventilation alone can control the hazard, employers may use **alternative protection procedures** for entry. To qualify for alternative procedures, employers must:
 - (1) Ensure that it is safe to remove the entrance cover;
 - (2) Determine that ventilation alone is sufficient to maintain the permit space safe for entry and work to be performed within the permit-required space must introduce no additional hazards;
 - (3) Gather monitoring and inspection data to support items 1 and 2 above;
 - (4) If entry is necessary to conduct initial data gathering, perform such entry under the full permit program; and
 - (5) Document the determinations and supporting data and make them available to employees.

Entry can take place after:

- (a) It has been determined safe to remove the entrance cover;
- (b) Any openings are guarded to protect against falling and falling objects;
- (c) Internal atmospheric testing is conducted;
- (d) Air remains without hazard whenever any employee is inside the space;
- (e) Continuous forced air ventilation has eliminated any hazardous atmosphere; and

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- (f) The space is tested periodically.

Employees must exit immediately if a hazardous atmosphere is detected during entry, and the space must be evaluated to determine how the hazardous atmosphere developed.

10.2 Confined Space Entry at ER Sites

At RFP, any confined space entry, if required as part of the scope of work for a remedial project, shall be identified in the HASP. Minimal requirements for working in a confined space are detailed in Procedure 1-15310-HSP-6.04, *Confined Space Entry Program*. Procedure HSP-6.04 defines a confined space, addresses responsibilities, training requirements, ventilation, atmosphere testing, protective equipment, confined space entry permits, and posting. All elements of a confined space entry must be incorporated into the HASP by reference or by procedure and into an Integrated Work Control Program (IWCP) package.

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CHAPTER 11

SPILL CONTAINMENT

11.0 Spill Containment Program

During operations that may cause a major spill, adequate spill containment equipment is required to provide for isolation and containment of the entire volume of the hazardous substance spilled. Spills that occur outside the boundaries of remedial project work sites will be covered by the *Hazardous Waste Requirements Manual*, Section 4, *Release Response and Reporting*.

Incidental spills that occur within the boundaries of the remedial project work site shall be responded to by the workers on site. Those spills which exceed the reportable quantity threshold as defined under RCRA shall be immediately reported to EOM as discussed in Section 7.6 of the Program Plan.

Materials required to respond to a spill shall be maintained at the remedial project work site. Major spills (non-incidental/reportable) require notification of the RFP Fire Department Hazardous Materials (HAZMAT) Team at 966-2911 for response and evaluation of personnel response to contain or cleanup.

Tasks that present a spill hazard must be identified in the HASP. The HASP shall also include a list of the:

- Materials that will be maintained at the remedial project work site for use in spill response;
- Detailed step-by-step actions to be taken for response; and
- List of persons responsible for completion of the actions.

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Incidental and reportable spills occurring within an RCA or potentially radiologically contaminated area, will be reported to RE. A radiological waste determination will be made in accordance with Procedure 4-16100-REP-1003, *Radiological Evaluation for Unrestricted Release of Property/Waste*, and with Procedure 4-16100-REP-1108, *Radiological Evaluation of Areas, Rooms, and Buildings*.

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Appendix C: Site Health and Safety Plan Boilerplate



APPENDIX A

REFERENCES

AND

RESOURCE DOCUMENTATION



References and Resource Documentation

DOE Order 5480.7	Fire Protection	HSP 30.00 Fire Protection Policy, Programs, Organization HSP 31.00 Fire Prevention HSP 34.00 Fire Protection
DOE Order 5480.8A	Contractor Occupational Medical Program	HSP 4.00 Medical Program
DOE Order 5480.10	Contractor Industrial Hygiene Program	HSP 13.00 Industrial Hygiene
DOE Order 5480.11	Radiation Protection for Occupational Workers	HSP 18.00 Radiation Protection Radiological Operating Instructions Radiological Engineering Procedures Manual Environmental Management Radiological Guidelines
DOE Order 5480.15	DOE Laboratory Accreditation Program for Personnel Dosimetry	Policy 4.1 Health and Safety Accident Prevention HSP 12.00 Industrial Safety
DOE Order N5480.6	Radiological Control Manual	Rocky Flats Site Radiological Control Manual, April 1993 Rocky Flats Site Radiological Control Manual Implementation Plan
DOE Order 5482.1B	Environmental, Safety, and Health Appraisal Program	
DOE Order 5483.1A	Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor- Operated Facilities	Policy 4.1 Health and Safety Accident Prevention
DOE Order 5484.1	Environmental Protection, Safety and Health Protection Information Reporting Requirements	

References and Resource Documentation

Regulatory Convention	Title	Resource Documentation
29 CFR 1904.0	Recording and Reporting Occupational Injuries and Illnesses	1-66100-HSP-3.03 Reporting Occupational Injury and Illness
29 CFR 1910.20	Access to Employees Exposure and Medical Records	HSP-4.05 Access to Employee Medical and Exposure Records
29 CFR 1910.95	Occupational Noise Exposure	
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response	1-62200-HSP-21.03 Hazardous Waste Operations 1-62200-HSP-21.04 Emergency Response and Spill Control
29 CFR 1910.121	Accreditation of Training Programs for Hazardous Waste Operations	1-10000-TUM Training Users Manual 1-62200-HSP-21.03 Hazardous Waste Operations
29 CFR 1910.132	General, Personal Protective Equipment	HSP 7.00 Protective Equipment HSP 8.01 Safe Work Apparel HSP 18.00 Radiation Protection
29 CFR 1910.133	Eye and Face Protection	1-62300-HSP-7.01 Eye and Face Protection Program HSP 7.04 Emergency Eyewash/Shower
29 CFR 1910.134	Respiratory Protection	1-62200-HSP-7.03 Respiratory Protection HSP 7.05 Breathing Air

References and Resource Documentation

29 CFR 1910.145	Specification for Accident Prevention Signs and Tags	HSP 10.01 Physical Hazards, Barricades, and Accident Prevention Signs and Tags HSP 18.03 Radiological Protection Signs, Labels, and Tags
29 CFR 1910.146	Permit Required Confined Spaces	1-15310-HSP-6.04 Confined Space Entry Program
29 CFR 1910.147	The Control of Hazardous Energy (Lockout/Tagout)	1-15320-HSP-2.08 Lockout/Tagout
29 CFR 1910.151	Medical Services and First Aid	HSP 4.02 Emergency Medical Response HSP 4.12 Ambulance Service
29 CFR 1910.155	Fire Protection	HSP 30.00 Fire Protection Policy, Programs, Organization HSP 31.00 Fire Prevention HSP 32.00 Fire and Line Safety HSP 34.00 Fire Protection
29 CFR 1910.1200	Hazard Communication Program	1-51310-HSP-9.07 Hazard Communication Program
29 CFR 1926	Safety and Health Regulations for Construction	1-C18-HSP-24.01 Safety and Health Responsibilities for Construction Activities
29 CFR 1926.52	Occupational Noise Exposure	HSP 7.06 Hearing Conservation Program

References and Resource Documentation

29 CFR 1926.53	Ionizing Radiation	HSP 18.00 Radiation Protection Radiological Operating Instructions Environmental Management Radiological Guidelines Manual
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, Mists	Plan for the Prevention of Contamination Dispersion
29 CFR 1926.57	Ventilation	HSP 2.14 Ventilation to Control Hazardous Material
29 CFR 1926.59	Hazard Communication	1-51310-HSP-9.07 Hazard Communication Program
29 CFR 1926.101	Hearing Protection	HSP 7.06 Hearing Conservation Program
29 CFR 1926.102	Eye and Face Protection	1-62300-HSP-7.01 Eye and Face Protection Program HSP 7.04 Emergency Eyewash/Shower
29 CFR 1926.103	Respiratory Protection	1-62200-HSP-7.03 Respiratory Protection 1-62200-HSP-7.05 Breathing Air
DOE Order 5400.5	Radiation Protection of the Public and the Environment	Manual No.-21000-WO 125 01.1 Workplan for the Control of Radionuclide Level in Water Discharges from the Rocky Flats Plant Manual No. 21000-WP-GPMP Groundwater Protection and Monitoring Program Plan for Rocky Flats Plant
DOE Order 5480.4	Environmental Safety and Health Program for DOE Operations	Policy 4.1 Health and Safety Accident Prevention

[illegible][illegible]



APPENDIX B

TITLE 29 OF THE CODE OF FEDERAL REGULATION 1910.120

HAZARDOUS WASTE OPERATIONS

AND

EMERGENCY RESPONSE



STANDARDS AND INTERPRETATIONS

1910.120—HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

(a) Scope, application, and definitions.

(1) **Scope.** This section covers the following operations, unless the employer can demonstrate that the operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards:

(i) Clean-up operations required by a governmental body, whether Federal, state, local or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority Site List (NPL), state priority site lists, sites recommended for the EPA NPL, and initial investigations of government identified sites which are conducted before the presence or absence of hazardous substances has been ascertained);

(ii) Corrective actions involving cleanup operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 *et seq.*);

(iii) Voluntary clean-up operations at sites recognized by Federal, state, local or other governmental bodies as uncontrolled hazardous waste sites;

(iv) Operations involving hazardous wastes that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA; or by agencies under agreement with U.S.E.P.A. to implement RCRA regulations; and

(v) Emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.

(2) Application.

(i) All requirements of Part 1910 and Part 1926 of Title 29 of the Code of Federal Regulations apply pursuant to their terms to hazardous waste and emergency response operations whether covered by this section or

not. If there is a conflict or overlap, the provision more protective of employee safety and health shall apply without regard to 29 CFR 1910.5(c)(1).

(ii) Hazardous substance clean-up operations within the scope of paragraphs (a)(1)(i) through (a)(1)(iii) of this section must comply with all paragraphs of this section except paragraphs (p) and (q).

(iii) Operations within the scope of paragraph (a)(1)(iv) of this section must comply only with the requirements of paragraph (p) of this section.

Exceptions: For large quantity generators of hazardous waste who store those wastes less than 90 days and for small quantity generators of hazardous wastes, who have emergency response teams that respond to releases of, or substantial threats of releases of, hazardous substances, for their RCRA workplaces only paragraph (p)(8) of this section is applicable. Such generators of hazardous wastes who do not have emergency response teams that respond to releases of, or substantial threats of releases of, hazardous substances are exempt from the requirements of this section.

(iv) Emergency response operations for releases of, or substantial threats of releases of, hazardous substances which are not covered by paragraphs (a)(1)(i) through (a)(1)(iv) of this section must only comply with the requirements of paragraph (q) of this section.

(3) **Definitions.** "Buddy system" means a system of organizing employees into work groups in such a manner that each employee of the work group is designated to be observed by at least one other employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

"Clean-up operation" means an operation where hazardous substances are removed, con-

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tained, incinerated, neutralized, stabilized, cleared-up, or in any other manner processed or handled with the ultimate goal of making the site safer for people or the environment.

"Decontamination" means the removal of hazardous substances from employees and their equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects.

"Emergency response" or "responding to emergencies" means a response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results or is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses within the scope of this standard. Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses.

"Facility" means (A) any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, storage container, motor vehicle, rolling stock, or aircraft, or (B) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any water-borne vessel.

(3) "Hazardous materials response (HAZMAT) team" means an organized group of employees, designated by the employer, who are expected to perform work to handle and control actual or potential leaks or spills of hazardous substances requiring possible close approach to the substance. The team members perform responses to releases or potential releases of hazardous substances for the purpose of control or stabilization of the incident. A HAZMAT team is not a fire brigade nor is a typical fire brigade a HAZMAT team. A HAZMAT team, however, may be a separate component of a fire brigade or fire department.

"Hazardous substance" means any substance designated or listed under paragraphs (A) through (D) of this definition, exposure to which results or may result in adverse effects on the health or safety of employees:

(a) Any substance defined under section 101(14) of CERCLA;

(b) Any biological agent and other disease-causing agent as defined in section 101(33) of CERCLA;

(c) Any substance listed by the U.S. Department of Transportation as hazardous materials under 49 CFR 172.101 and appendices; and

(d) Hazardous waste as herein defined.

"Hazardous waste" means

(a) A waste or combination of wastes as defined in 40 CFR 261.3, or

(b) Those substances defined as hazardous wastes in 49 CFR 171.8.

"Hazardous waste operation" means any operation conducted within the scope of this standard.

"Hazardous waste site" or "Site" means any facility or location within the scope of this standard at which hazardous waste operations take place.

"Health hazard" means a chemical, mixture of chemicals or a pathogen for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes stress due to temperature extremes. Further definition of the terms used above can be found in Appendix A to 29 CFR 1910.1200.

"IDLH" or "Immediately dangerous to life or health" means an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irrever-

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sible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere.

"Oxygen deficiency" means that concentration of oxygen by volume below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent oxygen.

"Permissible exposure limit" means the exposure, inhalation or dermal permissible exposure limit specified in 29 CFR Part 1910, Subparts G and Z.

"Published exposure level" means the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986 incorporated by reference, or if none is specified, the exposure limits published in the standards specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1987-88" dated 1987 incorporated by reference.

"Post emergency response" means that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and clean-up of the site has begun. If post emergency response is performed by an employer's own employees who were part of the initial emergency response, it is considered to be part of the initial response and not post emergency response. However, if a group of an employer's own employees, separate from the group providing initial response, performs the clean-up operation, then the separate group of employees would be considered to be performing post-emergency response and subject to paragraph (g)(11) of this section.

"Qualified person" means a person with specific training, knowledge and experience in the area for which the person has the responsibility and the authority to control.

"Site safety and health supervisor (or official)" means the individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.

"Small quantity generator" means a generator of hazardous wastes who in any calendar month generates no more than 1,000 kilograms (2,205 pounds) of hazardous waste in that month.

"Uncontrolled hazardous waste site" means an area where an accumulation of hazardous waste creates a threat to the health and safety of individuals or the environment or both. Some sites are found on public lands, such as those created by former municipal, county or state landfills where illegal or poorly managed waste disposal has taken place. Other sites are found on private property, often belonging to generators or former generators of hazardous waste. Examples of such sites include, but are not limited to, surface impoundments, landfills, dumps, and tank or drum farms. Normal operations at TSD sites are not covered by this definition.

(b) Safety and health program.

Note to (b): Safety and health programs developed and implemented to meet other Federal, state, or local regulations are considered acceptable in meeting this requirement if they cover or are modified to cover the topics required in this paragraph. An additional or separate safety and health program is not required by this paragraph.

(1) General.

(i) Employers shall develop and implement a written safety and health program for their employees involved in hazardous waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards, and provide for emergency response for hazardous waste operations.

(ii) The written safety and health program shall incorporate the following:

(a) An organizational structure:

(b) A comprehensive workplan:

(c) A site-specific safety and health plan which need not repeat the employer's standard operating procedures required in paragraph (b)(1)(ii)(F) of this section:

(d) The safety and health training program:

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(e) The medical surveillance program:

(f) The employer's standard operating procedures for safety and health; and

(g) Any necessary interface between general program and site specific activities.

(iii) **Site excavation.** Site excavations created during initial site preparation or during hazardous waste operations shall be shored or sloped as appropriate to prevent accidental collapse in accordance with Subpart P of 29 CFR Part 1926.

(iv) **Contractors and sub-contractors.** An employer who retains contractor or sub-contractor services for work in hazardous waste operations shall inform those contractors, sub-contractors, or their representatives of the site emergency response procedures and any potential fire, explosion, health, safety or other hazards of the hazardous waste operation that have been identified by the employer, including those identified in the employer's information program.

(v) **Program availability.** The written safety and health program shall be made available to any contractor or subcontractor or their representative who will be involved with the hazardous waste operation; to employees; to employee designated representatives; to OSHA personnel, and to personnel of other Federal, state, or local agencies with regulatory authority over the site.

(2) Organizational structure part of the site program.

(i) The organizational structure part of the program shall establish the specific chain of command and specify the overall responsibilities of supervisors and employees. It shall include, at a minimum, the following elements:

(a) A general supervisor who has the responsibility and authority to direct all hazardous waste operations.

(b) A site safety and health supervisor who has the responsibility and authority to develop and implement the site safety and health plan and verify compliance.

(c) All other personnel needed for hazardous waste site operations and emergency response and their general functions and responsibilities.

(d) The lines of authority, responsibility, and communication.

(ii) The organizational structure shall be reviewed and updated as necessary to reflect the current status of waste site operations.

(3) Comprehensive workplan part of the site program. The comprehensive workplan part of the program shall address the tasks and objectives of the site operations and the logistics and resources required to reach those tasks and objectives.

(i) The comprehensive workplan shall address anticipated clean-up activities as well as normal operating procedures which need not repeat the employer's procedures available elsewhere.

(ii) The comprehensive workplan shall define work tasks and objectives and identify the methods for accomplishing those tasks and objectives.

(iii) The comprehensive workplan shall establish personnel requirements for implementing the plan.

(iv) The comprehensive workplan shall provide for the implementation of the training required in paragraph (e) of this section.

(v) The comprehensive workplan shall provide for the implementation of the required informational programs required in paragraph (i) of this section.

(vi) The comprehensive workplan shall provide for the implementation of the medical surveillance program described in paragraph (f) of this section.

(4) Site-specific safety and health plan part of the program.

(i) **General.** The site safety and health plan, which must be kept on site, shall address the safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection.

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(ii) **Elements.** The site safety and health plan, as a minimum, shall address the following:

(a) A safety and health risk or hazard analysis for each site task and operation found in the workplan.

(b) Employee training assignments to assure compliance with paragraph (e) of this section.

(c) Personal protective equipment to be used by employees for each of the site tasks and operations being conducted as required by the personal protective equipment program in paragraph (g)(5) of this section.

(d) Medical surveillance requirements in accordance with the program in paragraph (f) of this section.

(e) Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used.

(f) Site control measures in accordance with the site control program required in paragraph (d) of this section.

(g) Decontamination procedures in accordance with paragraph (k) of this section.

(h) An emergency response plan meeting the requirements of paragraph (l) of this section for safe and effective responses to emergencies, including the necessary PPE and other equipment.

(i) Confined space entry procedures.

(j) A spill containment program meeting the requirements of paragraph (j) of this section.

(iii) **Pre-entry briefing.** The site specific safety and health plan shall provide for pre-entry briefings to be held prior to initiating any site activity, and at such other times as necessary to ensure that employees are apprised of the site safety and health plan and that this plan is being followed. The information and data obtained from site characterization and analysis work required in paragraph (c) of this

section shall be used to prepare and update the site safety and health plan.

(iv) **Effectiveness of site safety and health plan.** Inspections shall be conducted by the site safety and health supervisor or, in the absence of that individual, another individual who is knowledgeable in occupational safety and health, acting on behalf of the employer as necessary to determine the effectiveness of the site safety and health plan. Any deficiencies in the effectiveness of the site safety and health plan shall be corrected by the employer.

(c) **Site characterization and analysis.**

(1) **General.** Hazardous waste sites shall be evaluated in accordance with this paragraph to identify specific site hazards and to determine the appropriate safety and health control procedures needed to protect employees from the identified hazards.

(2) **Preliminary evaluation.** A preliminary evaluation of a site's characteristics shall be performed prior to site entry by a qualified person in order to aid in the selection of appropriate employee protection methods prior to site entry. Immediately after initial site entry, a more detailed evaluation of the site's specific characteristics shall be performed by a qualified person in order to further identify existing site hazards and to further aid in the selection of the appropriate engineering controls and personal protective equipment for the tasks to be performed.

(3) **Hazard identification.** All suspected conditions that may pose inhalation or skin absorption hazards that are immediately dangerous to life or health (IDLH), or other conditions that may cause death or serious harm, shall be identified during the preliminary survey and evaluated during the detailed survey. Examples of such hazards include, but are not limited to, confined space entry, potentially explosive or flammable situations, visible vapor clouds, or areas where biological indicators such as dead animals or vegetation are located.

(4) **Required information.** The following information to the extent available shall be obtained by the employer prior to allowing employees to enter a site:

(i) Location and approximate size of the site.

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(ii) Description of the response activity and/or the job task to be performed.

(iii) Duration of the planned employee activity.

(iv) Site topography and accessibility by air and roads.

(v) Safety and health hazards expected at the site.

(vi) Pathways for hazardous substance dispersion.

(vii) Present status and capabilities of emergency response teams that would provide assistance to hazardous waste clean-up site employees at the time of an emergency.

(viii) Hazardous substances and health hazards involved or expected at the site, and their chemical and physical properties.

(5) Personal protective equipment. Personal protective equipment (PPE) shall be provided and used during initial site entry in accordance with the following requirements:

(i) Based upon the results of the preliminary site evaluation, an ensemble of PPE shall be selected and used during initial site entry which will provide protection to a level of exposure below permissible exposure limits and published exposure levels for known or suspected hazardous substances and health hazards, and which will provide protection against other known and suspected hazards identified during the preliminary site evaluation. If there is no permissible exposure limit or published exposure level, the employer may use other published studies and information as a guide to appropriate personal protective equipment.

(ii) If positive-pressure self-contained breathing apparatus is not used as part of the entry ensemble, and if respiratory protection is warranted by the potential hazards identified during the preliminary site evaluation, an escape self-contained breathing apparatus of at least five minute's duration shall be carried by employees during initial site entry.

(iii) If the preliminary site evaluation does not produce sufficient information to identify the

hazards or suspected hazards of the site, an ensemble providing protection equivalent to Level B PPE shall be provided as minimum protection, and direct reading instruments shall be used as appropriate for identifying IDLH conditions. (See Appendix B for a description of Level B hazards and the recommendations for Level B protective equipment.)

(iv) Once the hazards of the site have been identified, the appropriate PPE shall be selected and used in accordance with paragraph (g) of this section.

(6) Monitoring. The following monitoring shall be conducted during initial site entry when the site evaluation produces information that shows the potential for ionizing radiation or IDLH conditions, or when the site information is not sufficient reasonably to eliminate these possible conditions:

(i) Monitoring with direct reading instruments for hazardous levels of ionizing radiation.

(ii) Monitoring the air with appropriate direct reading test equipment (i.e., combustible gas meters, detector tubes) for IDLH and other conditions that may cause death or serious harm (combustible or explosive atmospheres, oxygen deficiency, toxic substances).

(iii) Visually observing for signs of actual or potential IDLH or other dangerous conditions.

(iv) An ongoing air monitoring program in accordance with paragraph (h) of this section shall be implemented after site characterization has determined the site is safe for the startup of operations.

(7) Risk identification. Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these substances shall be identified. Employees who will be working on the site shall be informed of any risks that have been identified. In situations covered by the Hazard Communication Standard, 29 CFR 1910.1200, training required by that standard need not be duplicated.

Note to (c)(7).—Risks to consider include, but are not limited to:

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(a) Exposures exceeding the permissible exposure limits and published exposure levels.

(b) IDLH concentrations.

(c) Potential skin absorption and irritation sources.

(d) Potential eye irritation sources.

(e) Explosion sensitivity and flammability ranges.

(f) Oxygen deficiency.

(8) **Employee notification.** Any information concerning the chemical, physical, and toxicologic properties of each substance known or expected to be present on site that is available to the employer and relevant to the duties an employee is expected to perform shall be made available to the affected employees prior to the commencement of their work activities. The employer may utilize information developed for the hazard communication standard for this purpose.

(d) Site control.

(1) **General.** Appropriate site control procedures shall be implemented to control employee exposure to hazardous substances before clean-up work begins.

(2) **Site control program.** A site control program for protecting employees which is part of the employer's site safety and health program required in paragraph (b) of this section shall be developed during the planning stages of a hazardous waste clean-up operation and modified as necessary as new information becomes available.

(3) **Elements of the site control program.** The site control program shall, as a minimum, include: A site map; site work zones; the use of a "buddy system"; site communications including alerting means for emergencies; the standard operating procedures or safe work practices; and, identification of the nearest medical assistance. Where these requirements are covered elsewhere they need not be repeated.

(e) Training.

(1) General.

(i) All employees working on site (such as but

not limited to equipment operators, general laborers and others) exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site shall receive training meeting the requirements of this paragraph before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall receive review training as specified in this paragraph.

(ii) Employees shall not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility.

(2) **Elements to be covered.** The training shall thoroughly cover the following:

(i) Names of personnel and alternates responsible for site safety and health;

(ii) Safety, health and other hazards present on the site;

(iii) Use of personal protective equipment;

(iv) Work practices by which the employee can minimize risks from hazards;

(v) Safe use of engineering controls and equipment on the site;

(vi) Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards; and

(vii) The contents of paragraphs (g) through (j) of the site safety and health plan set forth in paragraph (b)(4)(ii) of this section.

(3) Initial training.

(i) General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor.

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(ii) Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geo-physical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

(iii) Workers regularly on site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off the site and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

(iv) Workers with 24 hours of training who are covered by paragraphs (a)(3)(ii) and (a)(3)(iii) of this section, and who become general site workers or who are required to wear respirators, shall have the additional 16 hours and two days of training necessary to total the training specified in paragraph (e)(3)(i).

(4) Management and supervisor training. On-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations shall receive 40 hours initial training, and three days of supervised field experience (the training may be reduced to 24 hours and one day if the only area of their responsibility is employees covered by paragraphs (e)(3)(ii) and (e)(3)(iii) and at least eight additional hours of specialized training at the time of job assignment on such topics as, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.

(5) Qualifications for trainers. Trainers shall be qualified to instruct employees about the subject matter that is being presented in training. Such

trainers shall have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they shall have the academic credentials and instructional experience necessary for teaching the subjects. Instructors shall demonstrate competent instructional skills and knowledge of the applicable subject matter.

(6) Training certification. Employees and supervisors that have received and successfully completed the training and field experience specified in paragraphs (e)(1) through (e)(4) of this section shall be certified by their instructor or the head instructor and trained supervisor as having successfully completed the necessary training. A written certificate shall be given to each person so certified. Any person who has not been so certified or who does not meet the requirements of paragraph (e)(9) of this section shall be prohibited from engaging in hazardous waste operations.

(7) Emergency response. Employees who are engaged in responding to hazardous emergency situations at hazardous waste clean-up sites that may expose them to hazardous substances shall be trained in how to respond to such expected emergencies.

(8) Refresher training. Employees specified in paragraph (e)(1) of this section, and managers and supervisors specified in paragraph (e)(4) of this section, shall receive eight hours of refresher training annually on the items specified in paragraph (e)(2) and/or (e)(4) of this section, any critique of incidents that have occurred in the past year that can serve as training examples of related work, and other relevant topics.

(9) Equivalent training. Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to that training required in paragraphs (e)(1) through (e)(4) of this section shall not be required to provide the initial training requirements of those paragraphs to such employees. However, certified employees new to a site shall receive appropriate, site specific training before site entry and have appropriate supervised field experience at the new site. Equivalent training includes any

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academic training or the training that existing employees might have already received from actual hazardous waste site work experience.

(f) Medical surveillance.

(1) General. Employers engaged in operations specified in paragraphs (a)(1)(i) through (a)(1)(iv) of this section and not covered by (a)(2)(iii) exceptions and employers of employees specified in paragraph (g)(9) shall institute a medical surveillance program in accordance with this paragraph.

(2) Employees covered. The medical surveillance program shall be instituted by the employer for the following employees:

(i) All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;

(ii) All employees who wear a respirator for 30 days or more a year or as required by § 1910.134;

(iii) All employees who are injured due to overexposure from an emergency incident involving hazardous substances or health hazards; or

(iv) Members of HAZMAT teams.

(3) Frequency of medical examinations and consultations.

Medical examinations and consultations shall be made available by the employer to each employee covered under paragraph (f)(2) of this section on the following schedules:

(i) For employees covered under paragraphs (f)(2)(i), (f)(2)(ii), and (f)(2)(iv):

(a) Prior to assignment:

(b) At least once every twelve months for each employee covered unless the attending physician believes a longer interval (not greater than biennially) is appropriate;

(c) At termination of employment or reas-

signment to an area where the employee would not be covered if the employee has not had an examination within the last six months:

(d) As soon as possible upon notification by an employee that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the permissible exposure limits or published exposure levels in an emergency situation;

(e) At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary.

(ii) For employees covered under paragraph (f)(2)(iii) and for all employees including those of employers covered by paragraph (a)(1)(v) who may have been injured, received a health impairment, developed signs or symptoms which may have resulted from exposure to hazardous substances resulting from an emergency incident, or exposed during an emergency incident to hazardous substances at concentrations above the permissible exposure limits or the published exposure levels without the necessary personal protective equipment being used:

(a) As soon as possible following the emergency incident or development of signs or symptoms;

(b) At additional times, if the examining physician determines that follow-up examinations or consultations are medically necessary.

(4) Content of medical examinations and consultations.

(i) Medical examinations required by paragraph (f)(3) of this section shall include a medical and work history (or updated history if one is in the employee's file) with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (i.e., temperature extremes) that may be expected at the work site.

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(ii) The content of medical examinations or consultations made available to employees pursuant to paragraph (f) shall be determined by the attending physician. The guidelines in the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (See Appendix D, Reference #10) should be consulted.

(5) Examination by a physician and costs. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine, and shall be provided without cost to the employee, without loss of pay, and at a reasonable time and place.

(6) Information provided to the physician. The employer shall provide one copy of this standard and its appendices to the attending physician, and in addition the following for each employee:

- (i) A description of the employee's duties as they relate to the employee's exposures.
- (ii) The employee's exposure levels or anticipated exposure levels.
- (iii) A description of any personal protective equipment used or to be used.
- (iv) Information from previous medical examinations of the employee which is not readily available to the examining physician.
- (v) Information required by §1910.134.

(7) Physician's written opinion.

(i) The employer shall obtain and furnish the employee with a copy of a written opinion from the attending physician containing the following:

- (a) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from work in hazardous waste operations or emergency response, or from respirator use.
- (b) The physician's recommended limitations upon the employee's assigned work.

(c) The results of the medical examination and tests if requested by the employee.

(d) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

(ii) The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposures.

(8) Recordkeeping.

(i) An accurate record of the medical surveillance required by paragraph (f) of this section shall be retained. This record shall be retained for the period specified and meet the criteria of 29 CFR 1910.20.

(ii) The record required in paragraph (f)(8)(i) of this section shall include at least the following information:

- (a) The name and social security number of the employee;
- (b) Physician's written opinions, recommended limitations, and results of examinations and tests;
- (c) Any employee medical complaints related to exposure to hazardous substances;
- (d) A copy of the information provided to the examining physician by the employer, with the exception of the standard and its appendices.

(g) Engineering controls, work practices, and personal protective equipment for employee protection.

Engineering controls, work practices, personal protective equipment, or a combination of these shall be implemented in accordance with this paragraph to protect employees from exposure to hazardous substances and safety and health hazards.

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(1) Engineering controls, work practices and PPE for substances regulated in Subparts G and Z.

(i) Engineering controls and work practices shall be instituted to reduce and maintain employee exposure to or below the permissible exposure limits for substances regulated by 29 CFR Part 1910, to the extent required by Subpart Z, except to the extent that such controls and practices are not feasible.

Note to (g)(1)(i): Engineering controls which may be feasible include the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment. Work practices which may be feasible are removing all non-essential employees from potential exposure during opening of drums, wetting down dusty operations and locating employees upwind of possible hazards.

(ii) Whenever engineering controls and work practices are not feasible, PPE shall be used to reduced and maintain employee exposures to or below the permissible exposure limits or dose limits for substances regulated by 29 CFR Part 1910, Subpart Z.

(iii) The employer shall not implement a schedule of employee rotation as a means of compliance with permissible exposure limits or dose limits except when there is no other feasible way of complying with the airborne or dermal dose limits for ionizing radiation.

(iv) The provisions of 29 CFR, Subpart G, shall be followed.

(2) Engineering controls, work practices, and PPE for substances not regulated in Subparts G and Z. An appropriate combination of engineering controls, work practices and personal protective equipment shall be used to reduce and maintain employee exposure to or below published exposure levels for hazardous substances and health hazards not regulated by 29 CFR Part 1910, Subparts G and Z. The employer may use the published literature and MSDS as a guide in making the employer's determination as to what level of protection the employer believes is appropriate for hazardous substances and health hazards for which there is no permissible exposure limit or published exposure limit.

(3) Personal protective equipment selection.

(i) Personal protective equipment (PPE) shall be selected and used which will protect employees from the hazards and potential hazards they are likely to encounter as identified during the site characterization and analysis.

(ii) Personal protective equipment selection shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site.

(iii) Positive pressure self-contained breathing apparatus, or positive pressure air-line respirators equipped with an escape air supply, shall be used when chemical exposure levels present will create a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

(iv) Totally-encapsulating chemical protective suits (protection equivalent to Level A protection as recommended in Appendix B) shall be used in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

(v) The level of protection provided by PPE selection shall be increased when additional information on site conditions indicates that increased protection is necessary to reduce employee exposures below permissible exposure limits and published exposure levels for hazardous substances and health hazards. (See Appendix B for guidance on selecting PPE ensembles.)

Note to (g)(3): The level of employee protection provided may be decreased when additional information or site conditions show that decreased protection will not result in hazardous exposures to employees.

(vi) Personal protective equipment shall be selected and used to meet the requirements of 29 CFR Part 1910, Subpart I, and additional requirements specified in this section.

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(4) Totally-encapsulating chemical protective suits.

(i) Totally-encapsulating suits shall protect employees from the particular hazards which are identified during site characterization and analysis.

(ii) Totally-encapsulating suits shall be capable of maintaining positive air pressure. (See Appendix A for a test method which may be used to evaluate this requirement.)

(iii) Totally-encapsulating suits shall be capable of preventing inward test gas leakage of more than 0.5 percent. (See Appendix A for a test method which may be used to evaluate this requirement.)

(5) Personal protective equipment (PPE) program.

A written personal protective equipment program, which is part of the employer's safety and health program required in paragraph (b) of this section or required in paragraph (p)(1) of this section and which is also a part of the site-specific safety and health plan shall be established. The PPE program shall address the elements listed below. When elements, such as donning and doffing procedures, are provided by the manufacturer of a piece of equipment and are attached to the plan, they need not be rewritten into the plan as long as they adequately address the procedure or element.

- (i) PPE selection based upon site hazards.
- (ii) PPE use and limitations of the equipment.
- (iii) Work mission duration.
- (iv) PPE maintenance and storage.
- (v) PPE decontamination and disposal.
- (vi) PPE training and proper fitting.
- (vii) PPE donning and doffing procedures.
- (viii) PPE inspection procedures prior to, during, and after use.
- (ix) Evaluation of the effectiveness of the PPE program, and
- (x) Limitations during temperature extremes, heat stress, and other appropriate medical considerations.

(h) Monitoring.**(1) General.**

(i) Monitoring shall be performed in accordance with this paragraph where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits or published exposure levels for hazardous substances.

(ii) Air monitoring shall be used to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of employee protection needed on site.

(2) Initial entry. Upon initial entry, representative air monitoring shall be conducted to identify any IDLH condition, exposure over permissible exposure limits or published exposure levels, exposure over a radioactive material's dose limits or other dangerous condition such as the presence of flammable atmospheres or oxygen-deficient environments.

(3) Periodic monitoring. Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed or when there is indication that exposures may have risen over permissible exposure limits or published exposure levels since prior monitoring. Situations where it shall be considered whether the possibility that exposures have risen are as follows:

- (i) When work begins on a different portion of the site.
- (ii) When contaminants other than those previously identified are being handled.
- (iii) When a different type of operation is initiated (e.g., drum opening as opposed to exploratory well drilling).
- (iv) When employees are handling leaking drums or containers or working in areas with obvious liquid contamination (e.g., a spill or lagoon).

(4) Monitoring of high-risk employees. After the actual clean-up phase of any hazardous waste

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operation commences; for example, when soil, surface water or containers are moved or disturbed; the employer shall monitor those employees likely to have the highest exposure to hazardous substances and health hazards likely to be present above permissible exposure limits or published exposure levels by using personal sampling frequently enough to characterize employee exposures. If the employees likely to have the highest exposure are over permissible exposure limits or published exposure limits, then monitoring shall continue to determine all employees likely to be above those limits. The employer may utilize a representative sampling approach by documenting that the employees and chemicals chosen for monitoring are based on the criteria stated above.

Note to (h): It is not required to monitor employees engaged in site characterization operations covered by paragraph (c) of this section.

(i) Informational programs.

Employers shall develop and implement a program, which is part of the employer's safety and health program required in paragraph (b) of this section, to inform employees, contractors, and subcontractors (or their representative) actually engaged in hazardous waste operations of the nature, level and degree of exposure likely as a result of participation in such hazardous waste operations. Employees, contractors and subcontractors working outside of the operations part of a site are not covered by this standard.

(j) Handling drums and containers.**(1) General.**

(i) Hazardous substances and contaminated soils, liquids, and other residues shall be handled, transported, labeled, and disposed of in accordance with this paragraph.

(ii) Drums and containers used during the clean-up shall meet the appropriate DOT, OSHA, and EPA regulations for the wastes that they contain.

(iii) When practical, drums and containers shall be inspected and their integrity shall be assured prior to being moved. Drums or containers that cannot be inspected before being moved because of storage conditions (i.e., buried beneath the earth, stacked behind other

drums, stacked several tiers high in a pile, etc.) shall be moved to an accessible location and inspected prior to further handling.

(iv) Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.

(v) Site operations shall be organized to minimize the amount of drum or container movement.

(vi) Prior to movement of drums or containers, all employees exposed to the transfer operation shall be warned of the potential hazards associated with the contents of the drums or containers.

(vii) U.S. Department of Transportation specified salvage drums or containers and suitable quantities of proper absorbent shall be kept available and used in areas where spills, leaks, or ruptures may occur.

(viii) Where major spills may occur, a spill containment program, which is part of the employer's safety and health program required in paragraph (b) of this section, shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred.

(ix) Drums and containers that cannot be moved without rupture, leakage, or spillage shall be emptied into a sound container using a device classified for the material being transferred.

(x) A ground-penetrating system or other type of detection system or device shall be used to estimate the location and depth of buried drums or containers.

(xi) Soil or covering material shall be removed with caution to prevent drum or container rupture.

(xii) Fire extinguishing equipment meeting the requirements of 29 CFR Part 1910, Subpart L, shall be on hand and ready for use to control incipient fires.

(2) Opening drums and containers. The following procedures shall be followed in areas where drums or containers are being opened:

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- (i) Where an airline respirator system is used, connections to the source of air supply shall be protected from contamination and the entire system shall be protected from physical damage.
- (ii) Employees not actually involved in opening drums or containers shall be kept a safe distance from the drums or containers being opened.
- (iii) If employees must work near or adjacent to drums or containers being opened, a suitable shield that does not interfere with the work operation shall be placed between the employee and the drums or containers being opened to protect the employee in case of accidental explosion.
- (iv) Controls for drum or container opening equipment, monitoring equipment, and fire suppression equipment shall be located behind the explosion-resistant barrier.
- (v) When there is a reasonable possibility of flammable atmospheres being present, material handling equipment and hand tools shall be of the type to prevent sources of ignition.
- (vi) Drums and containers shall be opened in such a manner that excess interior pressure will be safely relieved. If pressure can not be relieved from a remote location, appropriate shielding shall be placed between the employee and the drums or containers to reduce the risk of employee injury.
- (vii) Employees shall not stand upon or work from drums or containers.
- (3) **Material handling equipment.** Material handling equipment used to transfer drums and containers shall be selected, positioned and operated to minimize sources of ignition related to the equipment from igniting vapors released from ruptured drums or containers.
- (4) **Radioactive wastes.** Drums and containers containing radioactive wastes shall not be handled until such time as their hazard to employees is properly assessed.
- (5) **Shock sensitive wastes.** As a minimum, the following special precautions shall be taken when drums and containers containing or suspected of containing shock-sensitive wastes are handled:
- (i) All non-essential employees shall be evacuated from the area of transfer.
- (ii) Material handling equipment shall be provided with explosive containment devices or protective shields to protect equipment operators from exploding containers.
- (iii) An employee alarm system capable of being perceived above surrounding light and noise conditions shall be used to signal the commencement and completion of explosive waste handling activities.
- (iv) Continuous communications (i.e., portable radios, hand signals, telephones, as appropriate) shall be maintained between the employee-in-charge of the immediate handling area and both the site safety and health supervisor and the command post until such time as the handling operation is completed. Communication equipment or methods that could cause shock sensitive materials to explode shall not be used.
- (v) Drums and containers under pressure, as evidenced by bulging or swelling, shall not be moved until such time as the cause for excess pressure is determined and appropriate containment procedures have been implemented to protect employees from explosive relief of the drum.
- (vi) Drums and containers containing packaged laboratory wastes shall be considered to contain shock-sensitive or explosive materials until they have been characterized.
- Caution:** Shipping of shock sensitive wastes may be prohibited under U.S. Department of Transportation regulations. Employers and their shippers should refer to 49 CFR 173.21 and 173.50.
- (6) **Laboratory waste packs.** In addition to the requirements of paragraph (j)(5) of this section, the following precautions shall be taken, as a minimum, in handling laboratory waste packs (lab packs):
- (i) Lab packs shall be opened only when necessary and then only by an individual knowledgeable in the inspection, classification, and segregation of the containers within the pack according to the hazards of the wastes.
- (ii) If crystalline material is noted on any con-

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tainer, the contents shall be handled as a shock-sensitive waste until the contents are identified.

(7) Sampling of drum and container contents.

Sampling of containers and drums shall be done in accordance with a sampling procedure which is part of the site safety and health plan developed for and available to employees and others at the specific worksite.

(8) Shipping and transport.

(i) Drums and containers shall be identified and classified prior to packaging for shipment.

(ii) Drum or container staging areas shall be kept to the minimum number necessary to identify and classify materials safely and prepare them for transport.

(iii) Staging areas shall be provided with adequate access and egress routes.

(iv) Bulking of hazardous wastes shall be permitted only after a thorough characterization of the materials has been completed.

(9) Tank and vault procedures.

(i) Tanks and vaults containing hazardous substances shall be handled in a manner similar to that for drums and containers, taking into consideration the size of the tank or vault.

(ii) Appropriate tank or vault entry procedures as described in the employer's safety and health plan shall be followed whenever employees must enter a tank or vault.

(k) Decontamination.

(1) **General.** Procedures for all phases of decontamination shall be developed and implemented in accordance with this paragraph.

(2) Decontamination procedures.

(i) A decontamination procedure shall be developed, communicated to employees and implemented before any employees or equipment may enter areas on site where potential for exposure to hazardous substances exists.

(ii) Standard operating procedures shall be developed to minimize employee contact with hazardous substances or with equipment that has contacted hazardous substances.

(iii) All employees leaving a contaminated area shall be appropriately decontaminated; all contaminated clothing and equipment leaving a contaminated area shall be appropriately disposed of or decontaminated.

(iv) Decontamination procedures shall be monitored by the site safety and health supervisor to determine their effectiveness. When such procedures are found to be ineffective, appropriate steps shall be taken to correct any deficiencies.

(3) **Location.** Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.

(4) **Equipment and solvents.** All equipment and solvents used for decontamination shall be decontaminated or disposed of properly.

(5) Personal protective clothing and equipment.

(i) Protective clothing and equipment shall be decontaminated, cleaned, laundered, maintained or replaced as needed to maintain their effectiveness.

(ii) Employees whose non-impermeable clothing becomes wetted with hazardous substances shall immediately remove that clothing and proceed to shower. The clothing shall be disposed of or decontaminated before it is removed from the work zone.

(6) **Unauthorized employees.** Unauthorized employees shall not remove protective clothing or equipment from change rooms.

(7) **Commercial laundries or cleaning establishments.** Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment shall be informed of the potentially harmful effects of exposures to hazardous substances.

(8) **Showers and change rooms.** Where the decontamination procedure indicates a need for regular showers and change rooms outside of a

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contaminated area, they shall be provided and meet the requirements of 29 CFR 1910.141. If temperature conditions prevent the effective use of water, then other effective means for cleansing shall be provided and used.

(l) Emergency response by employees at uncontrolled hazardous waste sites.

(1) Emergency response plan.

(i) An emergency response plan shall be developed and implemented by all employers within the scope of this section to handle anticipated emergencies prior to the commencement of hazardous waste operations. The plan shall be in writing and available for inspection and copying by employees, their representatives, OSHA personnel and other governmental agencies with relevant responsibilities.

(ii) Employers who will evacuate their employees from the workplace when an emergency occurs, and who do not permit any of their employees to assist in handling the emergency, are exempt from the requirements of this paragraph if they provide an emergency action plan complying with section 1910.38(a) of this part.

(2) Elements of an emergency response plan. The employer shall develop an emergency response plan for emergencies which shall address, as a minimum the following:

- (i) Pre-emergency planning.
- (ii) Personnel roles, lines of authority, and communication.
- (iii) Emergency recognition and prevention.
- (iv) Safe distances and places of refuge.
- (v) Site security and control.
- (vi) Evacuation routes and procedures.
- (vii) Decontamination procedures which are not covered by the site safety and health plan.
- (viii) Emergency medical treatment and first aid.

(ix) Emergency alerting and response procedures.

(x) Critique of response and follow-up.

(xi) PPE and emergency equipment.

(3) Procedures for handling emergency incidents.

(i) In addition to the elements for the emergency response plan required in paragraph (1)(2) of this section, the following elements shall be included for emergency response plans:

(a) Site topography, layout, and prevailing weather conditions.

(b) Procedures for reporting incidents to local, state, and federal governmental agencies.

(ii) The emergency response plan shall be a separate section of the Site Safety and Health Plan.

(iii) The emergency response plan shall be compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and federal agencies.

(iv) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

(v) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.

(vi) An employee alarm system shall be installed in accordance with 29 CFR 1910.165 to notify employees of an emergency situation: to stop work activities if necessary; to lower background noise in order to speed communication; and to begin emergency procedures.

(vii) Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

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(m) Illumination.

Areas accessible to employees shall be lighted to not less than the minimum illumination intensities listed in the following Table H-120.1 while any work is in progress:

TABLE H-120.1—MINIMUM ILLUMINATION INTENSITIES IN FOOT-CANDLES

Foot-candles	Area or operations
5	General site areas.
3	Excavation and waste areas, accessways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: Warehouses, corridors, hallways, and exitways.
5	Tunnels, shafts, and general underground work areas. (Exception: Minimum of 10 foot-candles is required at tunnel and shaft heading during drilling mucking, and scaling. Mine Safety and Health Administration approved cap lights shall be acceptable for use in the tunnel heading).
10	General shops (e.g., mechanical and electrical equipment rooms, active storerooms, barracks or living quarters, locker or dressing rooms, dining areas, and indoor toilets and workrooms.)
30	First aid stations, infirmaries, and offices.

(n) Sanitation at temporary workplaces.**(1) Potable water.**

(i) An adequate supply of potable water shall be provided on the site.

(ii) Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers.

(iii) Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose.

(iv) Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

(2) Nonpotable water.

(i) Outlets for nonpotable water, such as water for firefighting purposes, shall be identified to indicate clearly that the water is unsafe and is not to be used for drinking, washing, or cooking purposes.

(ii) There shall be no cross-connection, open or potential, between a system furnishing potable water and a system furnishing nonpotable water.

(3) Toilet facilities.

(i) Toilets shall be provided for employees according to the following Table H-120.2.

TABLE H-120.2—TOILET FACILITIES

Number of employees	Minimum number of facilities
20 or fewer	One.
More than 20, fewer than 200.	One toilet seat and one urinal per 40 employees.
More than 200	One toilet seat and one urinal per 50 employees.

(ii) Under temporary field conditions, provisions shall be made to assure that at least one toilet facility is available.

(iii) Hazardous waste sites not provided with a sanitary sewer shall be provided with the following toilet facilities unless prohibited by local codes:

(a) Chemical toilets;

(b) Recirculating toilets;

(c) Combustion toilets; or

(d) Flush toilets.

(iv) The requirements of this paragraph for sanitation facilities shall not apply to mobile crews having transportation readily available to nearby toilet facilities.

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(v) Doors entering toilet facilities shall be provided with entrance locks controlled from inside the facility.

(4) **Food handling.** All food service facilities and operations for employees shall meet the applicable laws, ordinances, and regulations of the jurisdictions in which they are located.

(5) **Temporary sleeping quarters.** When temporary sleeping quarters are provided, they shall be heated, ventilated, and lighted.

(6) **Washing facilities.** The employer shall provide adequate washing facilities for employees engaged in operations where hazardous substances may be harmful to employees. Such facilities shall be in near proximity to the worksite; in areas where exposures are below permissible exposure limits and published exposure levels and which are under the controls of the employer; and shall be so equipped as to enable employees to remove hazardous substances from themselves.

(7) **Showers and change rooms.** When hazardous waste clean-up or removal operations commence on a site and the duration of the work will require six months or greater time to complete, the employer shall provide showers and change rooms for all employees exposed to hazardous substances and health hazards involved in hazardous waste clean-up or removal operations.

(i) Showers shall be provided and shall be provided and shall meet the requirements of 29 CFR 1910.141(d)(3).

(ii) Change rooms shall be provided and shall meet the requirements of 29 CFR 1910.141(e). Change rooms shall consist of two separate change areas separated by the shower area required in paragraph (n)(7)(i) of this section. One change area, with an exit leading off the worksite, shall provide employees with a clean area where they can remove, store, and put on street clothing. The second area, with an exit to the worksite, shall provide employees with an area where they can put on, remove and store work clothing and personal protective equipment.

(iii) Showers and change rooms shall be located in areas where exposures are below the permissible exposure limits and published exposure levels. If this cannot be accom-

plished, then a ventilation system shall be provided that will supply air that is below the permissible exposure limits and published exposure levels.

(iv) Employers shall assure that employees shower at the end of their work shift and when leaving the hazardous waste site.

(o) **New technology programs.**

(1) The employer shall develop and implement procedures for the introduction of effective new technologies and equipment developed for the improved protection of employees working with hazardous waste clean-up operations, and the same shall be implemented as part of the site safety and health program to assure that employee protection is being maintained.

(2) New technologies, equipment or control measures available to the industry, such as the use of foams, absorbents, adsorbents, neutralizers, or other means to suppress the level of air contaminants while excavating the site or for spill control, shall be evaluated by employers or their representatives. Such an evaluation shall be done to determine the effectiveness of the new methods, materials, or equipment before implementing their use on a large scale for enhancing employee protection. Information and data from manufacturers or suppliers may be used as part of the employer's evaluation effort. Such evaluations shall be made available to OSHA upon request.

(p) **Certain Operations Conducted Under the Resource Conservation and Recovery Act of 1976 (RCRA).**

Employers conducting operations at treatment, storage, and disposal (TSD) facilities specified in paragraph (a)(1)(iv) of this section not exempted by paragraph (a)(2)(iii) of this section shall provide and implement the programs specified in this paragraph.

(1) **Safety and health program.** The employer shall develop and implement a written safety and health program for employees involved in hazardous waste operations that shall be available for inspection by employees, their representatives and OSHA personnel. The program shall be designed to identify, evaluate and control safety and health hazards in their facilities

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for the purpose of employee protection, to provide for emergency response meeting the requirements of paragraph (p)(8) of this section and to address as appropriate site analysis, engineering controls, maximum exposure limits, hazardous waste handling procedures and uses of new technologies.

(2) Hazard communication program. The employer shall implement a hazard communication program meeting the requirements of 29 CFR 1910.1200 as part of the employer's safety and program.

Note to 1910.120.—The exemption for hazardous waste provided in §1910.1200 is applicable to this section.

(3) Medical surveillance program. The employer shall develop and implement a medical surveillance program meeting the requirements of paragraph (f) of this section.

(4) Decontamination program. The employer shall develop and implement a decontamination procedure meeting the requirements of paragraph (k) of this section.

(5) New technology program. The employer shall develop and implement procedures meeting the requirements of paragraph (o) of this section for introducing new and innovative equipment into the workplace.

(6) Material handling program. Where employees will be handling drums or containers, the employer shall develop and implement procedures meeting the requirements of paragraphs (j)(1)(ii) through (viii) and (xi) of this section, as well as (j)(3) and (j)(8) of this section prior to starting such work.

(7) Training program.

(i) New employees. The employer shall develop and implement a training program, which is part of the employer's safety and health program, for employees involved with hazardous waste operations to enable employees to perform their assigned duties and functions in a safe and healthful manner so as not to endanger themselves or other employees. The initial training shall be for 24 hours and refresher training shall be for eight hours annually. Employees who have received

the initial training required by this paragraph shall be given a written certificate attesting that they have successfully completed the necessary training.

(ii) Current employees. Employers who can show by an employee's previous work experience and/or training that the employee has had training equivalent to the initial training required by this paragraph, shall be considered as meeting the initial training requirements of this paragraph as to that employee. Equivalent training includes the training that existing employees might have already received from actual site work experience. Current employees shall receive eight hours of refresher training annually.

(iii) Trainers. Trainers who teach initial training shall have satisfactorily completed a training course for teaching the subjects they are expected to teach or they shall have the academic credentials and instruction experience necessary to demonstrate a good command of the subject matter of the courses and competent instructional skills.

(8) Emergency response program.

(i) Emergency response plan. An emergency response plan shall be developed and implemented by all employers. Such plans need not duplicate any of the subjects fully addressed in the employer's contingency planning required by permits, such as those issued by the U.S. Environmental Protection Agency, provided that the contingency plan is made part of the emergency response plan shall be a written portion of the employers safety and health program required in paragraph (p)(1) of this section. Employers who will evacuate their employees from the worksite location when an emergency occurs and who do not permit any of their employees to assist in handling the emergency are exempt from the requirements of paragraph (p)(8) if they provide an emergency action plan complying with §1910.38(a) of this part.

(ii) Elements of an emergency response plan. The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following areas to the extent that they are not addressed in any specific program required in this paragraph:

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- (a) Pre-emergency planning and coordination with outside parties.
- (b) Personnel roles, lines of authority, and communication.
- (c) Emergency recognition and prevention.
- (d) Safe distances and places of refuge.
- (e) Site security and control.
- (f) Evacuation routes and procedures.
- (g) Decontamination procedures.
- (h) Emergency medical treatment and first aid.
- (i) Emergency alerting and response procedures.
- (j) Critique of response and follow-up.
- (k) PPE and emergency equipment.

(iii) Training.

(a) Training for emergency response employees shall be completed before they are called upon to perform in real emergencies. Such training shall include the elements of the emergency response plan, standard operating procedures the employer has established for the job, the personal protective equipment to be worn and procedures for handling emergency incidents.

Exception #1: An employer need not train all employees to the degree specified if the employer divides the work force in a manner such that a sufficient number of employees who have responsibility to control emergencies have the training specified, and all other employees, who may first respond to an emergency incident, have sufficient awareness training to recognize that an emergency response situation exists and that they are instructed in that case to summon the fully trained employees and not attempt control activities for which they are not trained.

Exception #2: An employer need not train all employees to the degree specified if arrangements have been made in advance for an outside fully-trained emergency response team to

respond in a reasonable period and all employees, who may come to the incident first, have sufficient awareness training to recognize that an emergency response situation exists and they have been instructed to call the designated outside fully-trained emergency response team for assistance.

(b) Employee members of TSD facility emergency response organizations shall be trained to a level of competence in the recognition of health and safety hazards to protect themselves and other employees. This would include training in the methods used to minimize the risk from safety and health hazards; in the safe use of control equipment; in the selection and use of appropriate personal protective equipment; in the safe operating procedures to be used at the incident scene; in the techniques of coordination with other employees to minimize risks; in the appropriate response to over exposure from health hazards or injury to themselves and other employees; and in the recognition of subsequent symptoms which may result from over exposures.

(c) The employer shall certify that each covered employee has attended and successfully completed the training required in paragraph (p)(8)(iii) of this section, or shall certify the employee's competency at least yearly. The method used to demonstrate competency for certification of training shall be recorded and maintained by the employer.

(iv) Procedures for handling emergency incidents.

(a) In addition to the elements for the emergency response plan required in paragraph (p)(8)(ii) of this section, the following elements shall be included for emergency response plans to the extent that they do not repeat any information already contained in the emergency response plan:

(1) Site topography, layout, and prevailing weather conditions.

(2) Procedures for reporting incidents to local, state, and federal governmental agencies.

(b) The emergency response plan shall be compatible and integrated with the disas-

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ter, fire and/or emergency response plans of local, state, and federal agencies.

(c) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

(d) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.

(e) An employee alarm system shall be installed in accordance with 29 CFR 1910.165 to notify employees of an emergency situation; to stop work activities if necessary; to lower background noise in order to speed communication; and to begin emergency procedures.

(f) Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

(q) Emergency response to hazardous substance releases.

This paragraph covers employers whose employees are engaged in emergency response no matter where it occurs except that it does not cover employees engaged in operations specified in paragraphs (a)(1)(i) through (a)(1)(iv) of this section. Those emergency response organizations who have developed and implemented programs equivalent to this paragraph for handling releases of hazardous substances pursuant to section 303 of the Superfund Amendments and Reauthorization Act of 1986 (Emergency Planning and Community Right-to-Know Act of 1986, 42 U.S.C. 11003) shall be deemed to have met the requirements of this paragraph.

(1) **Emergency response plan.** An emergency response plan shall be developed and implemented to handle anticipated emergencies prior to the commencement of emergency response operations. The plan shall be in writing and available for inspection and copying by employees, their representatives and OSHA personnel. Employers who will evacuate their employees from the workplace when an emergency occurs, and who do not permit any of their employees to assist in handling the

emergency, are exempt from the requirements of this paragraph if they provide an emergency action plan in accordance with §1910.38(a) of this part.

(2) **Elements of an emergency response plan.** The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following to the extent that they are not addressed elsewhere:

(i) Pre-emergency planning and coordination with outside parties.

(ii) Personnel roles, lines of authority, training, and communication.

(iii) Emergency recognition and prevention.

(iv) Safe distances and places of refuge.

(v) Site security and control.

(vi) Evacuation routes and procedures.

(vii) Decontamination.

(viii) Emergency medical treatment and first aid.

(ix) Emergency alerting and response procedures.

(x) Critique of response and follow-up.

(xi) PPE and Emergency equipment.

(xii) Emergency response organizations may use the local emergency response plan or the state emergency response plan or both, as part of their emergency response plan to avoid duplication. Those items of the emergency response plan that are being properly addressed by the SARA Title III plans may be substituted into their emergency plan or otherwise kept together for the employer and employee's use.

(3) Procedures for handling emergency response.

(i) The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific Incident Command System (ICS). All emergency responders and their communications shall be coordinated and controlled through the individual in charge of the ICS assisted by the senior official present for each employer.

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Note to (q)(3)(i).—The "senior official" at an emergency response is the most senior official on the site who has the responsibility for controlling the operations at the site. Initially it is the senior officer on the first-due piece of responding emergency apparatus to arrive on the incident scene. As more senior officers arrive (i.e., battalion chief, fire chief, state law enforcement official, site coordinator, etc.) the position is passed up the line of authority which has been previously established.

(ii) The individual in charge of the ICS shall identify, to the extent possible, all hazardous substances or conditions present and shall address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies.

(iii) Based on the hazardous substances and/or conditions present, the individual in charge of the ICS shall implement appropriate emergency operations, and assure that the personal protective equipment worn is appropriate for the hazards to be encountered. However, personal protective equipment shall meet, at a minimum, the criteria contained in 29 CFR 1910.156(e) when worn while performing fire fighting operations beyond the incipient stage for any incident or site.

(iv) Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear positive pressure self-contained breathing apparatus while engaged in emergency response, until such time that the individual in charge of the ICS determines through the use of air monitoring that a decreased level of respiratory protection will not result in hazardous exposures to employees.

(v) The individual in charge of the ICS shall limit the number of emergency response personnel at the emergency site, in those areas of potential or actual exposure to incident or site hazards, to those who are actively performing emergency operations. However, operations in hazardous areas shall be performed using the buddy system in groups of two or more.

(vi) Back-up personnel shall stand by with equipment ready to provide assistance or res-

cue. Advance first aid support personnel, as a minimum, shall also stand by with medical equipment and transportation capability.

(vii) The individual in charge of the ICS shall designate a safety official, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibility to identify and evaluate hazards and to provide direction with respect to the safety of operations for the emergency at hand.

(viii) When activities are judged by the safety official to be an IDLH condition and/or to involve an imminent danger condition, the safety official shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at an emergency scene.

(ix) After emergency operations have terminated, the individual in charge of the ICS shall implement appropriate decontamination procedures.

(x) When deemed necessary for meeting the tasks at hand, approved self-contained compressed air breathing apparatus may be used with approved cylinders from other approved self-contained compressed air breathing apparatus provided that such cylinders are of the same capacity and pressure rating. All compressed air cylinders used with self-contained breathing apparatus shall meet U.S. Department of Transportation and National Institute for Occupational Safety and Health criteria.

(4) **Skilled support personnel.** Personnel, not necessarily an employer's own employees, who are skilled in the operation of certain equipment, such as mechanized earth moving or digging equipment or crane and hoisting equipment, and who are needed temporarily to perform immediate emergency support work that cannot reasonably be performed in a timely fashion by an employer's own employees, and who will be or may be exposed to the hazards at an emergency response scene, are not required to meet the training required in this paragraph for the employer's regular employees. However, these personnel shall be given an initial briefing at the site prior to their participation in an emergency response. The initial briefing shall

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include instruction in the wearing of appropriate personal protective equipment, what chemical hazards are involved, and what duties are to be performed. All other appropriate safety and health precautions provided to the employer's own employees shall be used to assure the safety and health of these personnel.

(5) **Specialist employees.** Employees who, in the course of their regular job duties, work with and are trained in the hazards of specific hazardous substances, and who will be called upon to provide technical advice or assistance at a hazardous substance release incident to the individual in charge, shall receive training or demonstrate competency in the area of their specialization annually.

(6) **Training.** Training shall be based on the duties and function to be performed by each responder of an emergency response organization. The skill and knowledge levels required for all new responders, those hired after the effective date of this standard, shall be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident. Employees who participate, or are expected to participate, in emergency response, shall be given training in accordance with the following paragraphs:

(i) **First responder awareness level.** First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release. First responders at the awareness level shall have sufficient training to have had sufficient experience to objectively demonstrate competency in the following areas.

(a) An understanding of what hazardous materials are, and the risks associated with them in an incident.

(b) An understanding of the potential outcomes associated with an emergency created when hazardous materials are present.

(c) The ability to recognize the presence of hazardous materials in an emergency.

(d) The ability to identify the hazardous materials, if possible.

(e) An understanding of the role of the first responder awareness individual in the employer's emergency response plan including the site security and control and the U.S. Department of Transportation's Emergency Response Guidebook.

(f) The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.

(ii) **First responder operations level.** First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:

(a) Knowledge of the basic hazard and risk assessment techniques.

(b) Know how to select and use proper personal protective equipment provided to the first responder operational level.

(c) An understanding of basic hazardous materials terms.

(d) Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.

(e) Know how to implement basic decontamination procedures.

(f) An understanding of the relevant standard operating procedures and termination procedures.

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(iii) **Hazardous materials technician.** Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder at the operations level in that they will approach the point of release in order to plug, patch or otherwise stop the release of a hazardous substance. Hazardous materials technicians shall have received at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

- (a) Know how to implement the employer's emergency response plan.
- (b) Know the classification, identification and verification of known and unknown materials by using field survey instruments and equipment.
- (c) Be able to function within an assigned role in the Incident Command System.
- (d) Know how to select and use proper specialized chemical personal protective equipment provided to the hazardous materials technician.
- (e) Understand hazard and risk assessment techniques.
- (f) Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with the unit.
- (g) Understand and implement decontamination procedures.
- (h) Understand termination procedures.
- (i) Understand basic chemical and toxicological terminology and behavior.

(iv) **Hazardous materials specialist.** Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician, however, those duties require a more directed or specific knowledge of the various substances they may be called upon to con-

tain. The hazardous materials specialist would also act as the site liaison with Federal, state, local and other government authorities in regards to site activities. Hazardous materials specialists shall have received at least 24 hours of training equal to the technician level and in addition have competency in the following areas and the employer shall so certify:

- (a) Know how to implement the local emergency response plan.
- (b) Understand classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment.
- (c) Know of the state emergency response plan.
- (d) Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.
- (e) Understand in-depth hazard and risk techniques.
- (f) Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.
- (g) Be able to determine and implement decontamination procedures.
- (h) Have the ability to develop a site safety and control plan.
- (i) Understand chemical, radiological and toxicological terminology and behavior.

(v) **On scene incident commander.** Incident commanders, who will assume control of the incident scene beyond the first responder awareness level, shall receive at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

- (a) Know and be able to implement the employer's incident command system.
- (b) Know how to implement the employer's emergency response plan.

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(c) Know and understand the hazards and risks associated with employees working in chemical protective clothing.

(d) Know how to implement the local emergency response plan.

(e) Know of the state emergency response plan and of the Federal Regional Response Team.

(f) Know and understand the importance of decontamination procedures.

(7) **Trainers.** Trainers who teach any of the above training subjects shall have satisfactorily completed a training course for teaching the subjects they are expected to teach, such as the courses offered by the U.S. Fire Academy, or they shall have the training and/or academic credentials and instructional experience necessary to demonstrate competent instructional skills and a good command of the subject matter of the courses they are to teach.

(8) **Refresher training.**

(i) Those employees who are trained in accordance with paragraph (q)(6) of this section shall receive annual refresher training of sufficient content and duration to maintain their competencies, or shall demonstrate competency in those areas at least yearly.

(ii) A statement shall be made of the training or competency, and if a statement of competency is made, the employer shall keep a record of the methodology used to demonstrate competency.

(9) **Medical surveillance and consultation.**

(i) Members of an organized and designated HAZMAT team and hazardous materials specialists shall receive a baseline physical examination and be provided with medical surveillance as required in paragraph (f) of this section.

(ii) Any emergency response employees who exhibits signs or symptoms which may have resulted from exposure to hazardous substances during the course of an emergency incident, either immediately or subsequently, shall be provided with medical consultation as required in paragraph (f)(3)(ii) of this section.

(10) **Chemical protective clothing.** Chemical protective clothing and equipment to be used by organized and designated HAZMAT team members, or to be used by hazardous materials specialists, shall meet the requirements of paragraphs (g)(3) through (5) of this section.

(11) **Post-emergency response operations.** Upon completion of the emergency response, if it is determined that it is necessary to remove hazardous substances, health hazards, and materials contaminated with them (such as contaminated soil or other elements of the natural environment) from the site of the incident, the employer conducting the clean-up shall comply with one of the following:

(i) Meet all of the requirements of paragraphs (b) through (c) of this section; or

(ii) Where the clean-up is done on plant property using plant or workplace employees, such employees shall have completed the training requirements of the following: 29 CFR 1910.38(a); 1910.134; 1910.1200, and other appropriate safety and health training made necessary by the tasks that they are expected to be performed such as personal protective equipment and decontamination procedures. All equipment to be used in the performance of the clean-up work shall be in serviceable condition and shall have been inspected prior to use.

APPENDICES TO 1910.120—HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

Note: The following appendices serve as non-mandatory guidelines to assist employees and employers in complying with the appropriate requirements of this section. However paragraph 1910.120(g) makes mandatory in certain circumstances the use of Level A and Level B PPE protection.

Appendix A—Personal Protective Equipment Test Methods

This appendix sets forth the nonmandatory examples of tests which may be used to evaluate compliance with § 1910.120 (g)(4)(ii) and (iii). Other tests and other challenge agents may be used to evaluate compliance.

A. Totally-encapsulating chemical protective suit pressure test.

1.0—Scope

1.1 This practice measures the ability of a gas tight totally-

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encapsulating chemical protective suit material, seams, and closures to maintain a fixed positive pressure. The results of this practice allow the gas tight integrity of a totally-encapsulating chemical protective suit to be evaluated.

1.2 Resistance of the suit materials to permeation, penetration, and degradation by specific hazardous substances is not determined by this test method.

2.0—Definition of terms

2.1 "Totally-encapsulated chemical protective suit (TECP suit)" means a full body garment which is constructed of protective clothing materials; covers the wearer's torso, head, arms, legs and respirator; may cover the wearer's hands and feet with tightly attached gloves and boots; completely encloses the wearer and respirator by itself or in combination with the wearer's gloves and boots.

2.2 "Protective clothing material" means any material or combination of materials used in an item of clothing for the purpose of isolating parts of the body from direct contact with a potentially hazardous liquid or gaseous chemicals.

2.3 "Gas tight" means, for the purpose of this test method, the limited flow of a gas under pressure from the inside of a TECP suit to atmosphere at a prescribed pressure and time interval.

3.0—Summary of test method

3.1 The TECP suit is visually inspected and modified for the test. The test apparatus is attached to the suit to permit inflation to the pre-test suit expansion pressure for removal of suit wrinkles and creases. The pressure is lowered to the test pressure and monitored for three minutes. If the pressure drop is excessive, the TECP suit fails the test and is removed from service. The test is repeated after leak location and repair.

4.0—Required Supplies

4.1 Source of compressed air.

4.2 Test apparatus for suit testing, including a pressure measurement device with a sensitivity of at least $\frac{1}{4}$ inch water gauge.

4.3 Vent valve closure plugs or sealing tape.

4.4 Soapy water solution and soft brush.

4.5 Stop watch or appropriate timing device.

5.0—Safety Precautions

5.1 Care shall be taken to provide the correct pressure safety devices required for the source of compressed air used.

6.0—Test Procedure

6.1 Prior to each test, the tester shall perform a visual inspection of the suit. Check the suit for seam integrity by visually examining the seams and gently pulling on the seams. Ensure that all air supply lines, fittings, visor, zippers, and valves are secure and show no signs of deterioration.

6.1.1 Seal off the vent valves along with any other normal inlet or exhaust points (such as umbilical air line fittings or face piece opening) with tape or other appropriate means (caps, plugs, fixture, etc.). Care should be exercised in the sealing process not to damage any of the suit components.

6.1.2 Close all closure assemblies.

6.1.3 Prepare the suit for inflation by providing an improvised connection point on the suit for connecting an air-line. Attach the pressure test apparatus to the suit to permit suit inflation from a compressed air source equipped with a pressure indicating regulator. The leak tightness of the pressure test apparatus should be tested before and after each test by closing off the end of the tubing attached to the suit and assuring a pressure of three inches water gauge for three minutes can be maintained. If a component is removed for the test, that component shall be replaced and a second test conducted with another component removed to permit a complete test of the ensemble.

6.1.4 The pre-test expansion pressure (A) and the suit test pressure (B) shall be supplied by the suit manufacturer, but in no case shall they be less than: (A) = three inches water gauge; and (B) = two inches water gauge. The ending suit pressure (C) shall be no less than 80 percent of the test pressure (B); i.e., the pressure drop shall not exceed 20 percent of the test pressure (B).

6.1.5 Inflate the suit until the pressure inside is equal to pressure (A), the pre-test expansion suit pressure. Allow at least one minute to fill out the wrinkles in the suit. Release sufficient air to reduce the suit pressure to pressure (B), the suit test pressure. Begin timing. At the end of three minutes, record the suit pressure as pressure (C), the ending suit pressure. The difference between the suit test pressure and the ending suit test pressure (B-C) shall be defined as the suit pressure drop.

6.1.6 If the suit pressure drop is more than 20 percent of the suit test pressure (B) during the three-minute test period, the suit fails the test and shall be removed from service.

7.0—Retest Procedure

7.1 If the suit fails the test check for leaks by inflating the suit to pressure (A) and brushing or wiping the entire suit (including seams, closures, lens gaskets, glove-to-sleeve joints, etc.) with a mild soap and water solution. Observe the suit for the formation of soap bubbles, which is an indication of a leak. Repair all identified leaks.

7.2 Retest the TECP suit as outlined in Test procedure 6.0.

8.0—Report

8.1 Each TECP suit tested by this practice shall have the following information recorded:

8.1.1 Unique identification number, identifying brand name, date of purchase, material of construction, and unique fit features, e.g., special breathing apparatus.

8.1.2 The actual values for test pressures (A), (B), and (C) shall be recorded along with the specific observation times. If the ending pressure (C) is less than 80 percent of the test pres-

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sure (B), the suit shall be identified as failing the test. When possible, the specific leak location shall be identified in the test records. Retest pressure data shall be recorded as an additional test.

8.1.3 The source of the test apparatus used shall be identified and the sensitivity of the pressure gauge shall be recorded.

8.1.4 Records shall be kept for each pressure test even if repairs are being made at the test location.

Caution

Visually inspect all parts of the suit to be sure they are positioned correctly and secured tightly before putting the suit back into service. Special care should be taken to examine each exhaust valve to make sure it is not blocked.

Care should also be exercised to assure that the inside and outside of the suit is completely dry before it is put into storage.

B. Totally-encapsulating chemical protective suit qualitative leak test.**1.0—Scope**

1.1 This practice semi-qualitatively tests gas tight totally-encapsulating chemical protective suit integrity by detecting inward leakage of ammonia vapor. Since no modifications are made to the suit to carry out this test, the results from this practice provide a realistic test for the integrity of the entire suit.

1.2 Resistance of the suit materials to permeation, penetration, and degradation is not determined by this test method. ASTM test methods are available to test suit materials for these characteristics and the tests are usually conducted by the manufacturers of the suits.

2.0—Definition of terms

2.1 "Totally-encapsulated chemical protective suit (TECP suit) means a full body garment which is constructed of protective clothing materials; covers the wearer's torso, head, arms, legs and respirator; may cover the wearer's hands and feet with tightly attached gloves and boots; completely encloses the wearer and respirator by itself or in combination with the wearer's gloves, and boots.

2.2 "Protective clothing material" means any material or combination of materials used in an item of clothing for the purpose of isolating parts of the body from direct contact with a potentially hazardous liquid or gaseous chemicals.

2.3 "Gas tight" means, for the purpose of this test method, the limited flow of a gas under pressure from the inside of a TECP suit to atmosphere at a prescribed pressure and time interval.

2.4 "Intrusion Coefficient" means a number expressing the level of protection provided by a gas tight totally-encapsulating chemical protective suit. The intrusion coefficient is calculated by dividing the test room challenge agent concentration by the

concentration of challenge agent found inside the suit. The accuracy of the intrusion coefficient is dependent on the challenge agent monitoring methods. The larger the intrusion coefficient the greater the protection provided by the TECP suit.

3.0—Summary of recommended practice

3.1 The volume of concentrated aqueous ammonia solution (ammonia hydroxide NH_4OH) required to generate the test atmosphere is determined using the directions outlined in 6.1. The suit is donned by a person wearing the appropriate respiratory equipment (either a positive pressure self-contained breathing apparatus or a positive pressure supplied air respirator) and worn inside the enclosed test room. The concentrated aqueous ammonia solution is taken by the suited individual into the test room and poured into an open plastic pan. A two-minute evaporation period is observed before the test room concentration is measured, using a high range ammonia length of stain detector tube. When the ammonia vapor reaches a concentration of between 1000 and 1200 ppm, the suited individual starts a standardized exercise protocol to stress and flex the suit. After this protocol is completed, the test room concentration is measured again. The suited individual exits the test room and his stand-by person measures the ammonia concentration inside the suit using a low range ammonia length of stain detector tube or other more sensitive ammonia detector. A stand-by person is required to observe the test individual during the test procedure; aid the person in donning and doffing the TECP suit; and monitor the suit interior. The intrusion coefficient of the suit can be calculated by dividing the average test area concentration by the interior suit concentration. A colorimetric ammonia indicator strip of bromophenol blue or equivalent is placed on the inside of the suit face piece lens so that the suited individual is able to detect a color change and know if the suit has a significant leak. If a color change is observed the individual shall leave the test room immediately.

4.0—Required supplies

4.1 A supply of concentrated aqueous (55 percent ammonium hydroxide by weight).

4.2 A supply of bromophenol blue indicating paper or equivalent, sensitive to 5-10 ppm ammonia or greater over a two-minute period of exposure. [pH 3.0 (yellow) to pH 4.6 (blue)]

4.3 A supply of high range (0.5-10 volume percent) and low range (5-700 ppm) detector tubes for ammonia and the corresponding sampling pump. More sensitive ammonia detectors can be substituted for the low range detector tubes to improve the sensitivity of this practice.

4.4 A shallow plastic pan (PVC) at least 12"x14"x1" and a half pint plastic container (PVC) with tightly closing lid.

4.5 A graduated cylinder or other volumetric measuring device of at least 50 milliliters in volume with an accuracy of at least ± 1 milliliters.

5.0—Safety precautions

5.1 Concentrated aqueous ammonium hydroxide, NH_4OH , is a corrosive volatile liquid requiring eye, skin, and respiratory protection. The person conducting the test shall review the MSDS for aqueous ammonia.

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5.2 Since the established permissible exposure limit for ammonia is 50 ppm, only persons wearing a positive pressure self-contained breathing apparatus or a positive pressure supplied air respirator shall be in the chamber. Normally only the person wearing the totally-encapsulating suit will be inside the chamber. A stand-by person shall have a positive pressure self-contained breathing apparatus, or a positive pressure supplied air respirator available to enter the test area should the suited individual need assistance.

5.3 A method to monitor the suited individual must be used during this test. Visual contact is the simplest but other methods using communication devices are acceptable.

5.4 The test room shall be large enough to allow the exercise protocol to be carried out and then to be ventilated to allow for easy exhaust of the ammonia test atmosphere after the test(s) are completed.

5.5 Individuals shall be medically screened for the use of respiratory protection and checked for allergies to ammonia before participating in this test procedure.

6.0—Test procedure

6.1.1 Measure the test area to the nearest foot and calculate its volume in cubic feet. Multiply the test area volume by 0.2 milliliters of concentrated aqueous ammonia solution per cubic foot of test area volume to determine the approximate volume of concentrated aqueous ammonia required to generate 1000 ppm in the test area.

6.1.2 Measure this volume from the supply of concentrated aqueous ammonia and place it into a closed plastic container.

6.1.3 Place the container, several high range ammonia detector tubes, and the pump in the clean test pan and locate it near the test area entry door so that the suited individual has easy access to these supplies.

6.2.1 In a non-contaminated atmosphere, open a pre-sealed ammonia indicator strip and fasten one end of the strip to the inside of the suit face shield lens where it can be seen by the wearer. Moisten the indicator strip with distilled water. Care shall be taken not to contaminate the detector part of the indicator paper by touching it. A small piece of masking tape or equivalent should be used to attach the indicator strip to the interior of the suit face shield.

6.2.2 If problems are encountered with this method of attachment, the indicator strip can be attached to the outside of the respirator face piece lens being used during the test.

6.3 Don the respiratory protective device normally used with the suit, and then don the TECP suit to be tested. Check to be sure all openings which are intended to be sealed (zippers, gloves, etc.) are completely sealed. DO NOT, however, plug off any venting valves.

6.4 Step into the enclosed test room such as a closet, bathroom, or test booth, equipped with an exhaust fan. No air should be exhausted from the chamber during the test because this will dilute the ammonia challenge concentrations.

6.5 Open the container with the premeasured volume of concentrated aqueous ammonia within the enclosed test room, and

pour the liquid into the empty plastic test pan. Wait two minutes to allow for adequate volatilization of the concentrated aqueous ammonia. A small mixing fan can be used near the evaporation pan to increase the evaporation rate of the ammonia solution.

6.6 After two minutes a determination of the ammonia concentration within the chamber should be made using the high range colorimetric detector tube. A concentration of 1000 ppm ammonia or greater shall be generated before the exercises are started.

6.7 To test the integrity of the suit the following four minute exercise protocol should be followed:

6.7.1 Raising the arms above the head with at least 15 raising motions completed in one minute.

6.7.2 Walking in place for one minute with at least 15 raising motions of each leg in a one-minute period.

6.7.3 Touching the toes with at least 10 complete motions of the arms from above the head to touching of the toes in a one-minute period.

6.7.4 Knee bends with at least 10 complete standing and squatting motions in a one-minute period.

6.8 If at any time during the test the colorimetric indicator paper should change colors, the test should be stopped and section 6.10 and 6.12 initiated (See 4.2).

6.9 After completion of the test exercise, the test area concentration should be measured again using the high range colorimetric detector tube.

6.10 Exit the test area.

6.11 The opening created by the suit zipper or other appropriate suit penetration should be used to determine the ammonia concentration in the suit with the low range length of stain detector tube or other ammonia monitor. The internal TECP suit air should be sampled far enough from the enclosed test area to prevent a false ammonia reading.

6.12 After completion of the measurement of the suit interior ammonia concentration the test is concluded and the suit is doffed and the respirator removed.

6.13 The ventilating fan for the test room should be turned on and allowed to run for enough time to remove the ammonia gas. The fan shall be vented to the outside of the building.

6.14 Any detectable ammonia in the suit interior (five ppm ammonia (NH₃) or more for the length of stain detector tube) indicates that the suit has failed the test. When other ammonia detectors are used a lower level of detection is possible, and it should be specified as the pass/fail criteria.

6.15 By following this test method, an intrusion coefficient of approximately 200 or more can be measured with the suit in completely operational condition. If the intrusion coefficient is 200 or more, then the suit is suitable for emergency response and field use.

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7.0—Retest procedures

7.1 If the suit fails this test, check for leaks by following the pressure test in test A above.

7.2 Retest the TECP suit as outlined in the test procedure 6.0.

8.0—Report

8.1 Each gas tight totally-encapsulating chemical protective suit tested by this practice shall have the following information recorded.

8.1.1 Unique identification number, identifying brand name, date of purchase, material of construction, and unique suit features: e.g., special breathing apparatus.

8.1.2 General description of test room used for test.

8.1.3 Brand name and purchase date of ammonia detector strips and color change data.

8.1.4 Brand name, sampling range, and expiration date of the length of stain ammonia detector tubes. The brand name and model of the sampling pump should also be recorded. If another type of ammonia detector is used, it should be identified along with its minimum detection limit for ammonia.

8.1.5 Actual test results shall list the two test area concentrations, their average, the interior suit concentration, and the calculated intrusion coefficient. Retest data shall be recorded as an additional test.

8.2 The evaluation of the data shall be specified as "suit passed" or "suit failed," and the date of the test. Any detectable ammonia (five ppm or greater for the length of stain detector tube) in the suit interior indicates the suit has failed this test. When other ammonia detectors are used, a lower level of detection is possible and it should be specified as the pass fail criteria.

Caution

Visually inspect all parts of the suit to be sure they are positioned correctly and secured tightly before putting the suit back into service. Special care should be taken to examine each exhaust valve to make sure it is not blocked.

Care should also be exercised to assure that the inside and outside of the suit is completely dry before it is put into storage.

Appendix B—General Description and Discussion of the Levels of Protection and Protective Gear

This appendix sets forth information about personal protective equipment (PPE) protection levels which may be used to assist employers in complying with the PPE requirements of this section.

As required by the standard, PPE must be selected which will protect employees from the specific hazards which they are likely to encounter during their work on-site.

Selection of the appropriate PPE is a complex process which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards: their routes of potential hazard to employees (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials (and seams) in providing a barrier to these hazards. The amount of protection provided by PPE is material-hazard specific. That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found which will provide continuous protection from the particular hazardous substance. In these cases the breakthrough time of the protective material should exceed the work durations, or the exposure after breakthrough may not pose a hazardous level.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits or equipment.

The more that is known about the hazards at the site, the easier the job of PPE selection becomes. As more information about the hazards and conditions at the site becomes available, the site supervisor can make decisions to up-grade or down-grade the level of PPE protection to match the tasks at hand.

The following are guidelines which an employer can use to begin the selection of the appropriate PPE. As noted above, the site information may suggest the use of combinations of PPE selected from the different protection levels (i.e., A, B, C, or D) as being more suitable to the hazards of the work. It should be cautioned that the listing below does not fully address the performance of the specific PPE material in relation to the specific hazards at the job site, and that PPE selection, evaluation and re-selection is an ongoing process until sufficient information about the hazards and PPE performance is obtained.

Part A. Personal protective equipment is divided into four categories based on the degree of protection afforded. (See Part B of this appendix for further explanation of Levels A, B, C, and D hazards.)

1. Level A—To be selected when the greatest level of skin, respiratory, and eye protection is required.

The following constitute Level A equipment: it may be used as appropriate:

1. Positive pressure, full face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA, approved by the National Institute for Occupational Safety and Health (NIOSH).

2. Totally-encapsulating chemical-protective suit.

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3. Coveralls.¹
4. Long underwear.¹
5. Gloves, outer, chemical-resistant.
6. Gloves, inner, chemical-resistant.
7. Boots, chemical-resistant, steel toe and shank.
8. Hard hat (under suit).¹

9. Disposable protective suit, gloves and boots (depending on suit construction, may be worn over totally-encapsulating suit).

II. Level B—The highest level of respiratory protection is necessary but a lesser level of skin protection is needed.

The following constitute Level B equipment: it may be used as appropriate.

1. Positive pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved).

2. Hooded chemical-resistant clothing (coveralls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls).

3. Coveralls.¹
4. Gloves, outer, chemical-resistant.
5. Gloves, inner, chemical-resistant.
6. Boots, outer, chemical-resistant steel toe and shank.
7. Boot-covers, outer, chemical-resistant (disposable).¹
8. Hard hat.¹
9. (Reserved)
10. Face shield.¹

III. Level C—The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators are met.

The following constitute Level C equipment: it may be used as appropriate.

1. Full-face or half-mask, air purifying respirators (NIOSH approved).
2. Hooded chemical-resistant clothing (coveralls; two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Coveralls.¹
4. Gloves, outer, chemical-resistant.

¹Optional, as applicable.

5. Gloves, inner, chemical-resistant.
6. Boots (outer), chemical-resistant steel toe and shank.¹
7. Boot-covers, outer, chemical-resistant (disposable).¹
8. Hard hat.¹
9. Escape mask.¹
10. Face shield.¹

IV. Level D—A work uniform affording minimal protection, used for nuisance contamination only.

The following constitute Level D equipment: it may be used as appropriate:

1. Coveralls.
2. Gloves.¹
3. Boots/shoes, chemical-resistant steel toe and shank.
4. Boots, outer, chemical-resistant (disposable).¹
5. Safety glasses or chemical splash goggles^{*}.
6. Hard hat.¹
7. Escape mask.¹
8. Face shield.¹

Part B. The types of hazards for which levels A, B, C, and D protection are appropriate are described below:

I. Level A—Level A protection should be used when:

1. The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases, or particulates; or the site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the skin;

2. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or

3. Operations are being conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.

II. Level B—Level B protection should be used when:

1. The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection;

2. The atmosphere contains less than 19.5 percent oxygen; or

3. The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.

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Note: This involves atmospheres with IDLH concentrations of specific substances that present severe inhalation hazards and that do not represent a severe skin hazard; or that do not meet the criteria for use of air-purifying respirators.

III. Level C—Level C protection should be used when:

1. The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;
2. The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and
3. All criteria for the use of air-purifying respirators are met.

IV. Level D—Level D protection should be used when:

1. The atmosphere contains no known hazard; and
2. Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Note: As stated before, combinations of personal protective equipment other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.

As an aid in selecting suitable chemical protective clothing, it should be noted that the National Fire Protection Association is developing standards on chemical protective clothing. These standards are currently undergoing public review prior to adoption, including:

NFPA 991—Standard on Vapor-Protective Suits for Hazardous Chemical Emergencies (EPA Level A Protective Clothing)

NFPA 991—Standard on Liquid Splash-Protective Suits for Hazardous Chemical Emergencies (EPA Level B Protective Clothing.)

NFPA 993—Standard on Liquid Splash-Protective Suits for Non-emergency, Non-flammable Hazardous Chemical Situations (EPA Level B Protective Clothing)

These standards would apply documentation and performance requirements to the manufacture of chemical protective suits. Chemical protective suits meeting these requirements would be labelled as compliant with the appropriate standard. When these standards are adopted by the National Fire Protection Association, it is recommended that chemical protective suits which meet these standards be used.

Appendix C—Compliance Guidelines

1. **Occupational Safety and Health Program.** Each hazardous waste site clean-up effort will require an occupational safety and health program headed by the site coordinator or the employer's representative. The purpose of the program will be the protection of employees at the site and will be an extension of the employer's overall safety and health program. The program will need to be developed before work begins on the site and implemented as work proceeds as stated in paragraph (b). The program is to facilitate coordination and communication

of safety and health issues among personnel responsible for the various activities which will take place at the site. It will provide the overall means for planning and implementing the needed safety and health training and job orientation of employees who will be working at the site. The program will provide the means for identifying and controlling worksite hazards and the means for monitoring program effectiveness. The program will need to cover the responsibilities and authority of the site coordinator or the employer's manager on the site for the safety and health of employees at the site, and the relationships with contractors or support services as to what each employer's safety and health responsibilities are for their employees on the site. Each contractor on the site needs to have its own safety and health program so structured that it will smoothly interface with the program of the site coordinator or principal contractor.

Also those employers involved with treating, storing or disposal of hazardous waste as covered in paragraph (p) must have implemented a safety and health program for their employees. This program is to include the hazard communication program required in paragraph (p)(1) and the training required in paragraphs (p)(7) and (p)(8) as parts of the employers comprehensive overall safety and health program. This program is to be in writing.

Each site or workplace safety and health program will need to include the following: (1) Policy statements of the line of authority and accountability for implementing the program, the objectives of the program and the role of the site safety and health supervisor or manager and staff; (2) means or methods for the development of procedures for identifying and controlling workplace hazards at the site; (3) means or methods for the development and communication to employees of the various plans, work rules, standard operating procedures and practices that pertain to individual employees and supervisors; (4) means for the training of supervisors and employees to develop the needed skills and knowledge to perform their work in a safe and healthful manner; (5) means to anticipate and prepare for emergency situations; and (6) means for obtaining information feedback to aid in evaluating the program and for improving the effectiveness of the program. The management and employees should be trying continually to improve the effectiveness of the program thereby enhancing the protection being afforded those working on the site.

Accidents on the site or workplace should be investigated to provide information on how such occurrences can be avoided in the future. When injuries or illnesses occur on the site or workplace, they will need to be investigated to determine what needs to be done to prevent this incident from occurring again. Such information will need to be used as feedback on the effectiveness of the program and the information turned into positive steps to prevent any reoccurrence. Receipt of employee suggestions or complaints relating to safety and health issues involved with site or workplace activities is also a feedback mechanism that can be used effectively to improve the program and may serve in part as an evaluative tool(s).

For the development and implementation of the program to be the most effective, professional safety and health personnel should be used. Certified Safety Professionals, Board Certified Industrial Hygienists or Registered Professional Safety Engineers are good examples of professional stature for safety and health managers who will administer the employer's program.

2. **Training.** The training programs for employees subject to the requirements of paragraph (e) of this standard should address the safety and health hazards employees should expect

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to find on hazardous waste clean-up sites; what control measures or techniques are effective for those hazards; what monitoring procedures are effective in characterizing exposure levels; what makes an effective employer's safety and health program; what a site safety and health plan should include; hands on training with personal protective equipment and clothing they may be expected to use; the contents of the OSHA standard relevant to the employee's duties and function; and, employee's responsibilities under OSHA and other regulations. Supervisors will need training in their responsibilities under the safety and health program and its subject areas such as the spill containment program, the personal protective equipment program, the medical surveillance program, the emergency response plan and other areas.

The training programs for employees subject to the requirements of paragraph (p) of this standard should address: the employer's safety and health program elements impacting employees; the hazard communication program; the medical surveillance program; the hazards and the controls for such hazards that employees need to know for their job duties and functions. All require annual refresher training.

The training programs for employees covered by the requirements of paragraph (q) of this standard should address those competencies required for the various levels of response such as: the hazards associated with hazardous substances; hazard identification and awareness; notification of appropriate persons; the need for and use of personal protective equipment including respirators; the decontamination procedures to be used; preplanning activities for hazardous substance incidents including the emergency response plan; company standard operating procedures for hazardous substance emergency responses; the use of the incident command system and other subjects. Hands-on training should be stressed whenever possible. Critiques done after an incident which include an evaluation of what worked and what did not and how could the incident be better handled the next time may be counted as training time.

For hazardous materials specialists (usually members of hazardous materials teams), the training should address the care, use and/or testing of chemical protective clothing including totally encapsulating suits, the medical surveillance program, the standard operating procedures for the hazardous materials team including the use of plugging and patching equipment and other subject areas.

Officers and leaders who may be expected to be in charge at an incident should be fully knowledgeable of their company's incident command system. They should know where and how to obtain additional assistance and be familiar with the local district's emergency response plan and the state emergency response plan.

Specialist employees such as technical experts, medical experts or environmental experts that work with hazardous materials in their regular jobs, who may be sent to the incident scene by the shipper, manufacturer or governmental agency to advise and assist the person in charge of the incident should have training on an annual basis. Their training should include the care and use of personal protective equipment including respirators; knowledge of the incident command system and how they are to relate to it; and those areas needed to keep them current in their respective field as it relates to safety and health involving specific hazardous substances.

Those skilled support personnel, such as employees who work for public works departments or equipment operators

who operate bulldozers, sand trucks, backhoes, etc., who may be called to the incident scene to provide emergency support assistance, should have at least a safety and health briefing before entering the area of potential or actual exposure. These skilled support personnel, who have not been a part of the emergency response plan and do not meet the training requirements, should be made aware of the hazards they face and should be provided all necessary protective clothing and equipment required for their tasks.

3. Decontamination. Decontamination procedures should be tailored to the specific hazards of the site, and may vary in complexity and number of steps, depending on the level of hazard and the employee's exposure to the hazard. Decontamination procedures and PPE decontamination methods will vary depending upon the specific substance, since one procedure or method may not work for all substances. Evaluation of decontamination methods and procedures should be performed, as necessary, to assure that employees are not exposed to hazards by re-using PPE. References in Appendix F may be used for guidance in establishing an effective decontamination program. In addition, the U.S. Coast Guard's Manual, "Policy Guidance for Response to Hazardous Chemical Releases," U.S. Department of Transportation, Washington, DC (COMDTINST M16465.30) is a good reference for establishing an effective decontamination program.

4. Emergency response plans. States, along with designated districts within the states, will be developing or have developed local emergency response plans. These state and district plans should be utilized in the emergency response plans called for in the standard. Each employer should assure that its emergency response plan is compatible with the local plan. The major reference being used to aid in developing the state and local district plans is the Hazardous Materials Emergency Planning Guide, NRT-1. The current Emergency Response Guidebook from the U.S. Department of Transportation, CMA's CHEMTREC and the Fire Service Emergency Management Handbook may also be used as resources.

Employers involved with treatment, storage, and disposal facilities for hazardous waste, which have the required contingency plan called for by their permit, would not need to duplicate the same planning elements. Those items of the emergency response plan that are properly addressed in the contingency plan may be substituted into the emergency response plan required in 1910.120 or otherwise kept together for employer and employee use.

5. Personal protective equipment programs. The purpose of personal protective clothing and equipment (PPE) is to shield or isolate individuals from the chemical, physical, and biologic hazards that may be encountered at a hazardous substance site.

As discussed in Appendix B, no single combination of protective equipment and clothing is capable of protecting against all hazards. Thus PPE should be used in conjunction with other protective methods and its effectiveness evaluated periodically.

The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress, and impaired vision, mobility, and communication. For any given situation, equipment and clothing should be selected that provide an adequate level of protection. However, over-protection, as well as under-protection, can be hazardous and should be avoided where possible.

Two basic objectives of any PPE program should be to protect the wearer from safety and health hazards, and to prevent

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injury to the wearer from incorrect use and/or malfunction of the PPE. To accomplish these goals, a comprehensive PPE program should include hazard identification, medical monitoring, environmental surveillance, selection, use, maintenance, and decontamination of PPE and its associated training.

The written PPE program should include policy statements, procedures, and guidelines. Copies should be made available to all employees, and a reference copy should be made available at the worksite. Technical data on equipment, maintenance manuals, relevant regulations, and other essential information should also be collected and maintained.

6. Incident command system (ICS). Paragraph 1910.120(q)(3)(ii) requires the implementation of an ICS. The ICS is an organized approach to effectively control and manage operations at an emergency incident. The individual in charge of the ICS is the senior official responding to the incident. The ICS is not much different than the "command post" approach used for many years by the fire service. During large complex fires involving several companies and many pieces of apparatus, a command post would be established. This enabled one individual to be in charge of managing the incident, rather than having several officers from different companies making separate, and sometimes conflicting, decisions. The individual in charge of the command post would delegate responsibility for performing various tasks to subordinate officers. Additionally, all communications were routed through the command post to reduce the number of radio transmissions and eliminate confusion. However, strategy, tactics, and all decisions were made by one individual.

The ICS is a very similar system, except it is implemented for emergency response to all incidents, both large and small, that involve hazardous substances.

For a small incident, the individual in charge of the ICS may perform many tasks of the ICS. There may not be any, or little, delegation of tasks to subordinates. For example, in response to a small incident, the individual in charge of the ICS, in addition to normal command activities, may become the safety officer and may designate only one employee (with proper equipment) as a backup to provide assistance if needed. OSHA does recommend, however, that at least two employees be designated as back-up personnel since the assistance needed may include rescue.

To illustrate the operation of the ICS, the following scenario might develop during a small incident, such as an overturned tank truck with a small leak of flammable liquid.

The first responding senior officer would implement and take command of the ICS. That person would size-up the incident and determine if additional personnel and apparatus were necessary; would determine what actions to take to control the leak; and, determine the proper level of personal protective equipment. If additional assistance is not needed, the individual in charge of the ICS would implement actions to stop and control the leak using the fewest number of personnel that can effectively accomplish the tasks. The individual in charge of the ICS then would designate himself as the safety officer and two other employees as a back-up in case rescue may become necessary. In this scenario, decontamination procedures would not be necessary.

A large complex incident may require many employees and difficult, time-consuming efforts to control. In these situations, the individual in charge of the ICS will want to delegate different tasks to subordinates in order to maintain a span of control that will keep the number of subordinates, that are reporting, to a manageable level.

Delegation of task at large incidents may be by location, where the incident scene is divided into sectors, and subordinate officers coordinate activities within the sector that they have been assigned.

Delegation of tasks can also be by function. Some of the functions that the individual in charge of the ICS may want to delegate at a large incident are: medical services; evacuation; water supply; resources (equipment, apparatus); media relations; safety; and, site control (integrate activities with police for crowd and traffic control). Also for a large incident, the individual in charge of the ICS will designate several employees as back-up personnel; and a number of safety officers to monitor conditions and recommend safety precautions.

Therefore, no matter what size or complexity an incident may be, by implementing an ICS there will be *one individual in charge* who makes the decisions and gives directions; and, all actions, and communications are coordinated through one central point of command. Such a system should reduce confusion, improve safety, organize and coordinate actions, and should facilitate effective management of the incident.

7. Site Safety and Control Plans. The safety and security of response personnel and others in the area of an emergency response incident site should be of primary concern to the incident commander. The use of a site safety and control plan could greatly assist those in charge of assuring the safety and health of employees on the site.

A comprehensive site safety and control plan should include the following: summary analysis of hazards on the site and a risk analysis of those hazards; site map or sketch; site work zones (clean zone, transition or decontamination zone, work or hot zone); use of the buddy system; site communications; command post or command center; standard operating procedures and safe work practices; medical assistance and triage area; hazard monitoring plan (air contaminate monitoring, etc.); decontamination procedures and area; and other relevant areas. This plan should be a part of the employer's emergency response plan or an extension of it to the specific site.

8. Medical surveillance programs. Workers handling hazardous substances may be exposed to toxic chemicals, safety hazards, biologic hazards, and radiation. Therefore, a medical surveillance program is essential to assess and monitor workers' health and fitness for employment in hazardous waste operations and during the course of work; to provide emergency and other treatment as needed; and to keep accurate records for future reference.

The Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities developed by the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), the U.S. Coast Guard (USCG), and the Environmental Protection Agency (EPA); October 1985 provides an excellent example of the types of medical testing that should be done as part of a medical surveillance program.

Appendix D—References

The following references may be consulted for further information on the subject of this standard:

1. OSHA Instruction DFO CPL 2.70—January 29, 1986, *Special Emphasis Program: Hazardous Waste Sites*.

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2. OSHA Instruction DFO CPL 2-2.37A—January 29, 1986. *Technical Assistance and Guidelines for Superfund and Other Hazardous Waste Site Activities.*
 3. OSHA Instruction DTS CPL 2.74—January 29, 1986. *Hazardous Waste Activity Form. OSHA 175.*
 4. **Hazardous Waste Inspections Reference Manual.** U.S. Department of Labor. Occupational Safety and Health Administration, 1986.
 5. Memorandum of Understanding Among the National Institute for Occupational Safety and Health, the Occupational Safety and Health Administration, the United States Coast Guard, and the United States Environmental Protection Agency. *Guidance for Worker Protection During Hazardous Waste Site Investigations and Clean-up and Hazardous Substance Emergencies.* December 18, 1980.
 6. **National Priorities List.** 1st Edition, October 1984: U.S. Environmental Protection Agency, Revised periodically.
 7. **The Decontamination of Response Personnel.** Field Standard Operating Procedures (F.S.O.P.) 7; U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Hazardous Response Support Division, December 1984.
 8. **Preparation of a Site Safety Plan.** Field Standard Operating Procedures (F.S.O.P.) 9; U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Hazardous Response Support Division, April 1985.
 9. **Standard Operating Safety Guidelines:** U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Hazardous Response Support Division, Environmental Response Team; November 1984.
 10. **Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.** National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), U.S. Coast Guard (USCG), and Environmental Protection Agency (EPA); October 1985.
 11. **Protecting Health and Safety at Hazardous Waste Sites: An Overview.** U.S. Environmental Protection Agency, EPA/625/9-85/006; September 1985.
 12. **Hazardous Waste Sites and Hazardous Substance Emergencies.** NIOSH Worker Bulletin. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health; December 1982.
 13. **Personal Protective Equipment for Hazardous Materials Incidents: A Selection Guide:** U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health; October 1984.
 14. **Fire Service Emergency Management Handbook.** International Association of Fire Chiefs Foundation, 101 East Holly Avenue, Unit 10B, Sterling, VA 22170, January 1985.
 15. **Emergency Response Guidebook.** U.S. Department of Transportation, Washington, DC, 1987.
 16. **Report to the Congress on Hazardous Materials Training, Planning and Preparedness.** Federal Emergency Management Agency, Washington, DC, July 1986.
 17. **Workbook for Fire Command.** Alan V. Brunacini and J. David Beageron, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269, 1985.
 18. **Fire Command.** Alan V. Brunacini, National Fire Protection, Batterymarch Park, Quincy, MA 02269, 1985.
 19. **Incident Command System.** Fire Protection Publications, Oklahoma State University, Stillwater, OK 74078, 1983.
 20. **Site Emergency Response Planning.** Chemical Manufacturers Association, Washington, DC 20037, 1986.
 21. **Hazardous Materials Emergency Planning Guide.** NRT-1, Environmental Protection Agency, Washington, DC, March 1987.
 22. **Community Teamwork: Working Together to Promote Hazardous Materials Transportation Safety.** U.S. Department of Transportation, Washington, DC, May 1983.
 23. **Disaster Planning Guide for Business and Industry.** Federal Emergency Management Agency, Publication No. FEMA 141, August 1987.
- (The Office of Management and Budget has approved the information collection requirements in this section under control number 1218-0139)

APPENDIX C

SITE HEALTH AND SAFETY PLAN

BOILERPLATE

**WITH
INSTRUCTIONS FOR COMPLETION OF
BOILERPLATE HASP TABLES**



SITE HEALTH AND SAFETY PLAN
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- 9.0 REFERENCES
 - 9.1 Federal and State Regulations
 - 9.2 DOE Orders
 - 9.3 Rocky Flats Plant Manuals

APPENDICES

- A Visitor Log
- B Lines of Responsibility
- C Chemical Hazards
- D Subcontractor Respiratory Protection Program
- E Involved Personnel
- F Project Site Maps
- G Location of Medical Assistance



1.1 SCOPE AND APPLICABILITY OF THE SITE HEALTH AND SAFETY PLAN (HASP)

Table 1-1 identifies the areas addressed by this plan.

[illegible]

AAC = actual area of concern

1.2 COMPANION DOCUMENTS

The documents listed in Table 1-2 must be available for use with this HASP. Documents must be sufficiently available such that document requirements may be complied with consistently.

TABLE 1-2

Document (check all that apply)	Location
<input type="checkbox"/> Health and Safety Practices Manual Volumes 1 & 2	
<input type="checkbox"/> Hazardous Waste Requirements Manual (HWRM)	
<input type="checkbox"/> Training Users Manual (TUM)	
Applicable Sections:	
<input type="checkbox"/> EMD Operating Procedures, Vol. 1.	
<input type="checkbox"/> WSRIC	
<input type="checkbox"/> WEMS	
<input type="checkbox"/> OSA:	
<input type="checkbox"/> OSA:	
<input type="checkbox"/> SOP:	
<input type="checkbox"/> Work plan	
<input type="checkbox"/> Environmental Management Radiological Guidelines Manual (EMRG)	
<input type="checkbox"/> EMD Operating Procedures, Vol. II: Groundwater	
<input type="checkbox"/> EMD Operating Procedures, Vol. III: Geotechnical	
<input type="checkbox"/> EMD Operating Procedures, Vol. IV: Surface Water	
<input type="checkbox"/> EMD Operating Procedures, Vol. V: Ecology	
<input type="checkbox"/> SOP:	
<input type="checkbox"/> JSA:	
<input type="checkbox"/> JSA:	
<input type="checkbox"/> Other:	
<input type="checkbox"/> Other:	

JSA = Job Safety Analysis

OSA = Operational Safety Analysis

SOP = Safe Operating Practice

WEMS = Waste Environmental Management System (for the Waste Isolation Pilot Plant waste acceptance criteria)

WSRIC = Waste Stream Residue Identification and Characterization

1.3 VISITORS

All visitors to the contamination reduction zone and exclusion zone at this location will be required to read and verify compliance with the provisions of this HASP. In addition, visitors will be expected to comply with relevant OSHA requirements such as medical monitoring, training, and respiratory protection as applicable. Appendix A contains a visitor log.

In the event that a visitor does not adhere to the provisions of the HASP, she/he will be requested to leave the work area. All nonconformance incidents will be recorded in the site log.

1.3.1 Minimum Entry Requirements for Visitors

Table 1-3 identifies minimum entry requirements for exclusion zones or support zones for IHSSs, PACs, and AACs addressed in this plan. Minimum entry requirements include training, PPE, and medical surveillance.

TABLE 1-3
Minimum Entry Requirements for Visitors

EZ	SZ	Location	Minimum entry requirements for Visitors (No hands on work)

EZ = Exclusion Zone as described in 6.0
SZ = Support Zone as described in 6.0

1.4 UNIT DESCRIPTIONS

Table 1-4 provides a description of IHSSs, PACs, and AACs as identified in Section 1.1 above.

TABLE 1-4
RCRA Unit Descriptions

IHSS/PAC/AAC	Description: SAMPLE
175	A 25' by 25' area in the eastern third of a storage yard south of Bldg. 980. Area used to store drums of maintenance and fabrication shops waste liquids. Generally drums contained waste oils and thinners.
IHSS/PAC/AAC	Description:
IHSS/PAC/AAC	Description:
IHSS/PAC/AAC	Description:
IHSS/PAC/AAC	Description:
IHSS/PAC/AAC	Description:

1.5 IDENTIFICATION OF HEALTH AND SAFETY RESPONSIBILITIES

Project management is responsible for the health and safety of personnel throughout an environmental investigation or restoration project site. Personnel health and safety is primarily a line management function. Each line manager is accountable to upper management for carrying out assigned work in a safe manner, protecting personnel from potential risks, and providing personnel with a healthy and safe environment as proscribed by this HASP. The ERHSPP delineates roles and responsibilities for personnel on ERM sites. Appendix B shows lines of responsibility for each area. If line management found an imminent danger hazard and required that operations be stopped, then operations shall not resume until the same level of line management approves resumption.

Specific responsibilities for each of the operations and support organizations are described in HSP 21.03, pp. 13-25. Specific responsibilities for the Environmental Restoration Management (ERM) Health & Safety Officer (HSO), EM Radiological Engineer (EMRE), EM Project Manager, subcontractor Project Manager, subcontractor Site Safety Officer (SSO), subcontractor Health and Safety Specialist (HSS), and subcontractor Health and Safety Specialist In Training (HSST) are further described in the EMRG, guideline number one.

Specific Health and Safety responsibilities for project personnel include the following:

EG&G CONTRACT TECHNICAL REPRESENTATIVE (CTR):

Responsibilities:

Responsibilities of the CTR are defined by Procurement policy and contractual agreements with the subcontractor.

Authorities:

Oversee all aspects in the completion and compliance of the subcontract. Inclusive are the authorities to rectify concerns related to compliance and procurement issues.

EG&G AND SUBCONTRACTOR PROJECT MANAGERS AND SITE SUPERVISORS:

Responsibilities:

- Ensure that the project is performed in a manner consistent with the health and safety program.
- Provide the SSO with the project information needed to develop health and safety plans.
- Ensure that the project health and safety plans are prepared/approved and properly implemented in a timely manner.
- Ensure that adequate funds are allocated to fully implement project health and safety plans.
- Ensure compliance with health and safety plans of subcontractor personnel.
- Coordinate with the SSO on health and safety matters.
- Inform subcontractors of EG&G H&S requirements.

Authorities:

- Assign an approved SSO to project and, if necessary, assign a suitably qualified replacement.
- Temporarily suspend field activities, if health and safety of personnel are endangered, pending an evaluation and approval for resumption of work by the SSO.
- Temporarily suspend an individual from field activities for infractions of the health and safety plan, pending an evaluation and approval for resumption of work by the SSO.

SUBCONTRACTOR SITE SAFETY OFFICER (SSO) (or EG&G Site Supervisor, where no subcontractor or SSO exists):

The SSO will be appointed by the Project Manager with the approval of the ERHSO.

Responsibilities:

- Implement the applicable HASP and verify compliance with all applicable health and safety requirements.
- Ensure that updated copies of the Health and Safety Plan (HASP), EMRGs, and all documents referenced by the HASP and EMRG are available to subcontractor employees.
- Supervise HSSs in the performance of their responsibilities.
- Ensure HSSs and subcontractor employees are advised of the radiological hazards, both expected and suspected, by posting and controlling radiological areas according to EMRG instructions.
- Ensure that HSP 18.19, "Criteria and Actions for Potential Intakes", is adhered to for the duration of the project.
- Be first aid/CPR trained.
- Evaluate results of monitoring/sampling and recommend modification of HASP as necessary.
- Verify that performance testing of EG&G and subcontractor-owned instruments has been conducted in accordance with the manufacturer's recommendations. The SSO will also ensure that the test results are recorded daily in a calibration log specific to each instrument.

- Review and approve completed survey reports/forms. If an unsatisfactory report/form is received, it will be returned to the appropriate individual(s) for correction. When conducting this review, the SSO will ensure that:
 - the correct report/form is complete
 - the entries are reasonable
 - the required signatures are affixed to the report
- Forward approved survey reports/forms to the EMRE and maintain a file of all completed Radiological Survey Forms. This file will be organized by survey areas, with an index placed in the front of the file.
- Immediately contact the EMRE by phone when survey results indicate radiation levels exceeding 5 millirems/hour (mrem/h). For contaminant radiation levels requiring access controls not already established, or levels exceeding an established action level, the EMRE will also be notified.
- Maintain an Instrumentation Field Log Book which documents the specific equipment used at the work site.

Authorities:

- Can temporarily suspend field activities, if health and safety of personnel are endangered, pending further consideration and approval for resumption of work by the SHSC.
- Can temporarily suspend an individual from field activities for infractions of the health and safety plan, pending further consideration and approval for resumption of work by the HSC.

SUBCONTRACTOR HEALTH & SAFETY SPECIALIST (HSS)/HEALTH & SAFETY SPECIALIST IN TRAINING (HSST) (where no subcontractor HSS or HSST exists the Site Supervisor has the responsibilities listed and will obtain assistance from RO and IH):

The HSS/HSST must be approved by RE and IH. The HSS/HSST shall assist the SSO in implementing site Health and Safety Plans (HASP). An HSS/HSST will be present (in the immediate vicinity) during all activities involving potential exposure to hazardous waste. None of these activities shall be permitted in the absence of an HSS.

Responsibilities:

- Ensure that each individual within his/her jurisdiction complies with the provisions of the HASP.
- Implement the EMRG (for subcontractors) or ROI (for EG&G).
- Provide onsite air monitoring during field activities.
- Be first aid/CPR trained.
- Conduct radiological surveys and document the results.
- Audit safety practices used by onsite teams.
- Communicate with command post for onsite activities.
- Supervise decontamination, monitor workers for heat or cold stress, and distribute health and safety equipment.
- Document safety practices.
- Initiate appropriate emergency procedures.
- Forward completed survey reports/forms to the SSO.
- Notify the SSO of survey results that indicate radiation levels exceeding 5 mrem/h, levels requiring access controls not already established, or levels exceeding an established action level.
- Control access and advise all personnel when radiological precautions are required.
- Complete performance and operational checks required for radiation instruments and make entries in the Instrumentation Field Log Book.

Authority:

The HSS/HSST shall have the authority to stop work in case of an imminent safety hazard or potentially dangerous situation. After stopping work, the HSS/HSST shall immediately consult the SSO. The HSST must obtain HSS countersignatures on all survey reports.

SUPPORT SERVICES:

Support services are provided by Health and Safety personnel from the following organizations: Criticality Engineering, Facilities Safety Engineering, Fire Department, Fire Protection, Industrial Hygiene and Safety, Occupational Health, Radiological Protection.

Responsibilities for EG&G Health and Safety Liaison Officer, EG&G Health and Safety Coordinators (HSC), and the EG&G ERHSO follow.

EG&G HEALTH & SAFETY LIAISON OFFICER (HSLO):

The H&S Liaison Officer's duties include the following:

- Coordinate health and safety activities with the Environmental Restoration HSO and the Environmental Restoration Management Site Project Managers.
- Supervise the EG&G Site H&S Coordinators at each OU.
- Coordinate health and safety guidance for hazardous waste operations in HWAs.
- Coordinate preparation and approval of HWA Health and Safety Plans.
- Coordinate quarterly health and safety audits and inspections of health and safety programs and program documentation for subcontractors for hazardous waste operations.
- Perform formal audits of EG&G Hazardous Waste Operations Training Courses on an annual basis. The purpose of these audits is to ensure compliance with OSHA requirements for hazardous waste operations training.
- Coordinate review and approval of HASP field changes.

EG&G ENVIRONMENTAL RESTORATION H&S OFFICER (ERHSO):

The ERHSO's duties include the following:

- Manage and implement the EM H&S Program.
- Ensure that a HASP is written for each OU, and that subcontractors prepare site or task-specific HASPs.
- Provide support to ERM Project Managers.
- Coordinate review of HASPs as required for ERM activities with the H&S Liaison Officer.
- Perform review and approval of ERM HASP field changes.

EG&G SITE HEALTH & SAFETY COORDINATOR (SHSC)

SHSC is appointed from the EG&G Industrial Hygiene department. The SHSC's duties include the following:

- Evaluate EG&G and subcontractor work to verify compliance with the requirements of HASPs.
- Perform inspections for proper and appropriate use of PPE, monitoring and decontamination procedures, site control, and all required documentation.
- Alert the OU Site Project Manager, H&S Liaison Officer, and the ERHSO of health and safety violations at OUs.
- Provide health and safety support for EG&G employees.

1.6 FIELD CHANGE FORM

The forms following shall be used to change or update the HASP. Anyone can initiate a change in the HASP by filling out the HASP Field Change Form and submitting it to the ERHSO. The ERHSO will review the change and submit to the affected H&S disciplines as needed for concurrence. The ERHSA will obtain final approval from the Project Manager and H&S Liaison Officer. Once interim approval is obtained by signatures of ERHSO, Project Manager, and H&S Liaison Officer, the Field Change Form will be submitted to the EG&G Document Control Officer to be annotated on a DMR.

EG&G HASP FIELD CHANGE FORM

Field Change Number: _____ Effective Date: _____

Requested by: _____
(Print Name) Signature/Date

Pen and Ink changes to be made to the HASP to alert the reader of this change:

Reason for the change to be incorporated into the HASP:

Text of change to be incorporated:

APPROVALS:

ERHSO/Date

H&S Liaison Officer/Date

Project Manager/Date

AS NEEDED CONCURRENCE:

Occupational Safety

Radiological Engineering

Industrial Hygiene

Occupational Health

Fire Department

Radiological Operations

2.0 HEALTH AND SAFETY HAZARD ASSESSMENT

2.1 TASK ANALYSIS

Table 2-1 assigns task numbers to each discrete task at this (these) IHSS(s), PAC(s), or AAC(s). Tasks are broken down into steps. When Standard Operating Procedures (SOPs), or Operational Safety Analyses (OSAs) exist for any of the steps in a task, they are listed here. These documents may further clarify the steps in a particular task.

Example:

TASK #	TASK TITLE	SOP/OSA if applicable	TASK DESCRIPTION	TASK STEPS
1	Tank cleaning	N/A	Cleaning inside surface of chemical tank	1. Pump out tank contents. 2. Pressure wash tank contents. 3. Pump out rinsate. 4. Enter tank and brush scrub. 5. Triple rinse tank. 6. Decontaminate equipment and personnel.

IHSS/PAC/AAC NUMBER(S) (if applicable) OR LOCATION: _____

**TABLE 2-1
TASK ANALYSIS**

TASK #	TASK TITLE	SOP/OSA if applicable	TASK DESCRIPTION	TASK STEPS
1				1. 2. 3. 4. 5. 6. 7.

IHSS/PAC/AAC NUMBER(S) (if applicable) OR LOCATION: _____

TASK #	TASK TITLE	SOP/OSA	TASK DESCRIPTION	TASK STEPS
2				1. 2. 3. 4. 5. 6. 7.

IHSS/PAC/AAC NUMBER(S) (if applicable) OR LOCATION: _____

TASK #	TASK TITLE	SOP/OSA	TASK DESCRIPTION	TASK STEPS
3				1. 2. 3. 4. 5. 6. 7.

IHSS/PAC/AAC NUMBER(S) (if applicable) OR LOCATION: _____

TASK #	TASK TITLE	SOP/OSA	TASK DESCRIPTION	TASK STEPS
4				1. 2. 3. 4. 5. 6. 7.

IHSS/PAC/AAC NUMBER(S) (if applicable) OR LOCATION: _____

TASK #	TASK TITLE	SOP/OSA if applicable	TASK DESCRIPTION	TASK STEPS
				1. 2. 3. 4. 5. 6. 7.

IHSS/PAC/AAC NUMBER(S) (if applicable) OR LOCATION: _____

TASK #	TASK TITLE	SOP/OSA if applicable	TASK DESCRIPTION	TASK STEPS
				1. 2. 3. 4. 5. 6. 7.

IHSS/PAC/AAC NUMBER(S) (if applicable) OR LOCATION: _____

TASK #	TASK TITLE	SOP/OSA if applicable	TASK DESCRIPTION	TASK STEPS
				1. 2. 3. 4. 5. 6. 7.

IHSS/PAC/AAC NUMBER(S) (if applicable) OR LOCATION: _____

TASK #	TASK TITLE	SOP/OSA if applicable	TASK DESCRIPTION	TASK STEPS
				1. 2. 3. 4. 5. 6. 7.

IHSS/PAC/AAC NUMBER(S) (if applicable) OR LOCATION: _____

Attach additional pages if necessary.

2.2 HAZARD ANALYSIS

Potential hazards associated with hazardous waste operations in this (these) location(s) were identified by reviewing the physical layout of each area, the tasks associated with each area, and, where available, the results of chemical and radiological monitoring during previous operations. Radiological, physical, chemical, and other hazards potentially encountered during routine tasks are presented in Table 2-2, sections one, two, three, four, and five and Appendix C. Where applicable, Operational Safety Analyses, Standard Operating Procedures, and pre-existing hazard analysis documents are referenced. Hazard analysis and control for non-routine activities may be described in applicable Job Safety analyses or Integrated Work Control Program packages.

TABLE 2-2 HAZARD ANALYSIS AND CONTROL WORKSHEET BY TASK

Sections of Table 2-2 which are not applicable to this task should be marked N/A.

TASK #	TASK TITLE	IHSS, etc.

2-2.1 RADIOLOGICAL HAZARDS

Are radiological hazards fully described in (check all that apply): ☐ OSA ☐ WSRIC ☐ OTHER:

ISOTOPE PRESENT	MEDIUM	% DAC*	FIXED CONTAMINA- TION dpm/100 cm ²	REMOVABLE CONTAMINA- TION dpm/100 cm ²	DOSE RATE NEUTRON	DOSE RATE BETA/GAMMA

DAC = derived air concentration (hours)

dpm = disintegrations per minute

cm² = square centimeters

* based on % conc in soil and measured total conc in air

2-2.2 CHEMICAL HAZARDS

Are chemical hazards fully described in (check all that apply): ☐ Workplan ☐ WEMS ☐ WSRIC
☐ OTHER: ☐ OTHER:

Complete Appendix C, then mark all of the following which apply to this task:

Hazard Type	Are concentrations greater than 1/2 PEL* or 10% LEL expected in this task?	Job Duty	Routes of Exposure During Task Inhalation (I), Body Splash (B), Face Splash (F), Hands (H), Other - specify
<input type="checkbox"/> VOC's	<input type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Unknown		
<input type="checkbox"/> Corrosives	<input type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Unknown		
<input type="checkbox"/> Fire hazard	<input type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Unknown		
<input type="checkbox"/> Carcinogens	<input type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Unknown		
<input type="checkbox"/> Other Toxins	<input type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Unknown		

PEL = Permissible Exposure Limit * use Threshold Limit Value (TLV), or recommended exposure limit (REL) if more restrictive

LEL = Lower Explosive Limit

VOCs = Volatile Organic Compounds

2-2.3 BIOLOGICAL HAZARDS

Are biological hazards present during the task? () Yes () No

If so, describe: _____

Controls: _____

TASK #	TASK TITLE	HWA

2-2.4 CONFINED SPACES

Confined space entries must comply with HSP 6.04 unless equally restrictive subcontractor plan is used.

List type/location of confined spaces associated with this task:

1. _____	3. _____
2. _____	4. _____

2-2.5 PHYSICAL HAZARDS

Are the physical hazards of this task fully described in (check all that apply): () Workplan () SOP () OSA
() OTHER:

If not, check all that apply and complete the following:

	HSP SECTION	CONTROL MEASURES
() Compressed Gas Cylinders Describe:	HSP 11.01	
() Hoisting and Rigging Describe:	HSP 12.02	
() Machine Safe Guarding Describe:	HSP12.09	
() Excavations and Trenching Describe:	HSP 12.08	
() Ladders Describe:	HSP 22.02	
() Heat Stress () Cold Stress Describe:	N/A	
() Noise Describe:	HSP 7.06	
() Electrical Hazards Describe:	HSP 15	
() Other Describe:		
() Other Describe:		
() Other Describe:		
() Other Describe:		

3.0 HEALTH AND SAFETY HAZARD CONTROL

Hazard control includes administrative, engineering and personal protective equipment methods. Table 2-2, section four includes control measures for each physical hazard identified. Table 3-1 defines administrative and engineering controls, personal protective equipment, and monitoring requirements for radiological and chemical hazards.

3.1 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The criteria used to determine appropriate levels of personal protective equipment include the work being conducted; potential chemical, radiological and physical hazards at the site; availability of monitoring data; effectiveness of engineering or administrative exposure controls; and applicable regulations. As stated in HSP 8.01, Safe Work Apparel, Occupational Safety and Industrial Hygiene will identify to supervisors the required job-specific protective clothing. Rad Operations identifies job-specific protective clothing for radiological hazards in the Radiological Work Permit (RWP). This selection will be based upon the site hazards as specified in Table 2-2 and Appendix C.

HSP 7.03, Respiratory Protection, and HSP 7.05, Breathing Air, detail plant policy for respiratory protection. Refer to these practices for guidance on respiratory protection selection, issue and return, training, fit testing, medical evaluation, and limitations during temperature extremes.

Subcontractors may utilize their own Respiratory Protection Program provided it has been approved by the EG&G Respiratory Protection Program Administrator.

Will subcontractor respiratory protection program be used? () Yes () No

Industrial Hygiene and Radiological Engineering shall evaluate control requirements and modifications according to the site monitoring. In the event of an emergency, the Radiological Protection Technician (RPT) and Radiological Engineering have authority to modify PPE for radiological hazards. The Industrial Hygienist may modify PPE requirements for non-radiological hazards. PPE upgrades shall be implemented when site monitoring indicates exposure limits meet or exceed the appropriate action levels of the specific contaminant(s) being monitored. Action levels are specified in Table 3-1, section 4.

PPE donning steps should be performed as specified in the order listed in the donning procedure as follows. PPE should be inspected as described in the inspection procedure as follows.

Donning Procedure

(check all that apply, to reflect PPE to be used on each task)

[illegible]

Use additional sheets as necessary.

PPE Inspection Checklists

(check all that apply)

() CLOTHING

Before use:

- Determine that the clothing material is correct for the specified task at hand per HASP.
 - Visually inspect for: imperfect seams, non-uniform coatings, tears, malfunctioning closures
 - Hold up to light and check for pinholes
 - Flex product: observe for cracks; observe for other signs of shelf deterioration
 - If the product has been used previously, inspect inside and out for signs of chemical attack: discoloration, swelling, stiffness
 - During the work task, periodically inspect for: evidence of chemical attack such as discoloration, swelling, stiffening, and softening. Keep in mind, however, that chemical permeation can occur without any visible effects.
 - Closure failure, tears, punctures, seam discontinuities
-

() GLOVES

Before use, pressurize glove to check for pinholes. Roll gauntlet towards fingers or inflate glove and hold under water. In either case, no air should escape.

() FULLY-ENCAPSULATING SUITS

Before use:

- Check the operation of pressure relief valves.
 - Inspect the fitting of wrists, ankles, and neck.
 - Check faceshield, if so equipped, for: cracks, crazing, fogginess
-

() SCBA

- Inspect SCBAs: before and after each use; at least monthly when in storage; every time they are cleaned
 - Check all connections for tightness.
 - Check material conditions for: signs of pliability; signs of deterioration; signs of distortion
 - Check for proper setting and operation of regulators and valves (according to manufacturer's recommendations).
 - Check operation of alarm(s).
 - Check faceshields and lenses for: cracks, crazing, fogginess
-

() AIR-PURIFYING RESPIRATORS

- Inspect air-purifying respirators: before each use to be sure they have been adequately cleaned; after each use; during cleaning; monthly if in storage for emergency use
- Check material conditions for: signs of pliability, signs of deterioration, signs of distortion
- Examine cartridges or canisters to ensure that: they are the proper type for the intended use; the expiration date has not been passed; they have not been opened or used previously
- Check faceshields and lenses for: cracks, crazing, fogginess

3.2 MONITORING

The procedures for *monitoring* for hazards may include direct-reading instrumentation, radiation and contamination surveys, personal monitoring, and area sampling for chemical, radiological, biological and/or physical hazards. The objectives of this monitoring program are:

- To characterize the work area for the presence of gases, particulates (dusts, mists, fibers, smoke and fumes), and vapors in the atmosphere.
- To record background levels of contaminants and document possible releases.
- To obtain sufficient quantitative measurements for ascertaining the correct site control assessments and boundaries, the appropriate levels of PPE for personnel, and decontamination procedures.
- To collect a sufficient number of samples to characterize personal exposure levels.
- To recognize conditions that may be immediately dangerous to life and health.
- To evaluate overall effectiveness of exposure controls implemented at the site.

Table 3-1.2 and 3-1.4 describe frequency and type of monitoring based upon the site hazards as specified in Table 2-2 and Appendix C. Industrial Hygiene and Safety identifies non-radiological and physical hazard monitoring; Radiological Engineering defines radiological hazard monitoring requirements.

The Industrial Hygiene Procedures Manual, Section 1.2, 1.3, 1.4, 1.5, and 2.2 describe quality assurance/quality control and recordkeeping SOPs for non-radiological Industrial Hygiene samples. The Radiological Control Manual specifies quality assurance/quality control and recordkeeping for radiological samples.

3.3 OTHER CONTROL MEASURES

Standard 29 CFR 1910.120(g) requires that "Engineering controls and work practices shall be instituted to reduce and maintain employee exposure to or below the permissible exposure limits...except to the extent that such controls and practices are not feasible." Such control measures including engineering controls are specified in Table 3-1.3. Eating, drinking, or smoking is not permitted in contaminated areas.

3.4 CONFINED SPACES

Confined space entries must comply with HSP 6.04, Confined Space Entry Program. All confined spaces associated with this task are listed in Table 2-2.4. Subcontractor confined space programs must be at least as protective as HSP 6.04.

Will confined space entries be a part of the task(s) covered by this HASP? () Yes () No

Will subcontractor confined space plan be used? () Yes () No

If yes, include as an appendix.

3.5 NEW TECHNOLOGIES

The H&S Liaison Officer will coordinate evaluation of new technologies and equipment developed for the improved protection of employees working with hazardous waste clean-up operations for implementation at this site. The H&S Liaison Officer will coordinate evaluation of these technologies with the assistance of resources in each of the H&S departments as applicable. Any employee may introduce such a new technology to the H&S Liaison Officer.

TABLE 3-1 RADIATION AND NON-RADIOLOGICAL CHEMICAL HAZARD CONTROL BY TASK

Sections of Table 3-1 which are not applicable to this task should be marked N/A.

TASK #	TASK TITLE	HWA

3-1.1 RADIOLOGICAL POSTINGS REQUIRED	() See RWP
() Radiation Work Permit Required for Access	() Very High Radiation Area
() Dosimeter Badge	() Self Contained Breathing Apparatus
() Radiological Controlled Area	() Respirator Ready for Use
() Enter Only at Step-Off Pad	() Full-Face With Charcoal/HEPA Cartridges
() No Consumables	() Supplied Breathing Air
() White or Visitor Coveralls	() Air-Line Respirators
() Shoe Covers	() Airborne Radioactivity Area
() Whole Body Monitoring	() Respiratory Protection Required
() Radiation Area	() Dose Rate Ranges
() High Radiation Area	

3-1.2 RADIOLOGICAL MONITORING REQUIRED	FREQUENCY	TYPE	EQUIPMENT
ROUTINE CONTAMINATION SURVEY			
ROUTINE RADIATION SURVEY			
CONTINUOUS MONITORING			

3-1.3 ENGINEERING OR ADMINISTRATIVE CONTROLS EMPLOYED	DESCRIBE
() Local Exhaust Ventilation	
() Dilution (General) Ventilation	
() Enclosure/Glovebag	
() Dust Suppression	

TASK #	TASK TITLE	HWA

3-1.4 NON-RADIOLOGICAL CHEMICAL MONITORING REQUIREMENTS		ACTION LEVELS		
Contaminant	Type of Real Time Instrument or Analytical Method	Frequency/ Locations	Action:	Action:

3-1.5 PERSONAL PROTECTIVE EQUIPMENT:					
Job Duty	Safety Shoes & Safety glasses	Body Covering Type	Glove Type	Respirator Type (Specify cartridge if applicable)	Other (i.e., hard hat, earplugs)
	() yes () no				
	() yes () no				
	() yes () no				

4.0 PERSONNEL HEALTH AND SAFETY TRAINING REQUIREMENTS

HSP 21.03 specifies Hazardous Waste Operations and Emergency Response Training requirements for hazardous waste activities. Additionally, the following training is necessary for personnel performing hands-on work in each of the tasks indicated. Training requirements for visitors is described in Table 1-3.

REQUIRED TRAINING	TASK NUMBER								
	1	2	3	4	5	6	7	8	9
Building Indoctrination #									
General Employee Training #019-235-01									
Waste Dtermination & Waste Stream & Residue Identification and Characterization #125-574-01									
Nuclear Material Safeguards #038-597-01									
Hazard Communication #019-750-01									
Nuclear Criticality Safety #023-415-01									
Radiation Worker Level 1 #023-480-01									
Radiation Worker Level 2 #023-482-01									
Respirator Indoctrination #056-284-01									
Respirator Fit #056-284-02									
24 Hour OSHA #018-691-02									
40 Hour OSHA #018-691-03									
8 Hour OSHA Refresher #018-691-05									
8 Hour OSHA Supervisor #018-691-01									
RCRA CBT #023-435-01									
RCRA Supervisors Checklist #018-442-01									
RCRA Org. Air Emission Briefing #019-866-01									
RCRA Waste Management #018-863-01									
RCRA Waster Mgmt for Supervisor #018-862-01									
RCRA Tank #016-863-01									
Waste Generator Non-Radioactive ¹ #067-285-02									
Waste Generator Solid Radioactive ¹ #067-285-01									
Other:									
Other:									

A-Items required for entry into HWA

B-Items required for controlled area entry (No hands on work)

C-Items required for controlled area entry (Hands on work)

X-Items required by specific job classification

1-Includes appropriate qualifications standards package

5.0 MEDICAL SURVEILLANCE REQUIREMENTS

The EG&G Medical Surveillance program is described in HSP 4.00, Medical Program, Chapters 4.02 -4.17. Subcontractor Medical Surveillance Programs should comply with the requirements of 29 CFR 1910.120(f).

Will Subcontractor Medical Surveillance Plan be used? () Yes () No

Physical examination practices are described in HSP 4.09, Physical Examinations. HSP 21.03 defines hazardous waste workers for purposes of medical surveillance. According to that definition, the persons or positions described in Appendix E are enrolled in the RFP Medical Surveillance program for hazardous waste workers.

Table 5.0 identifies task specific medical monitoring which is in addition to the medical surveillance for hazardous waste workers. Medical surveillance is required for all respirator wearers and is not otherwise specified here.

Table 5.0

Task	Hazardous Substance for Medical Monitoring	Medical Monitoring	Sampling Time

Specific work zones shall be designated on the site during invasive activities which create potential exposures (opening drums, etc.) or during spills. Site control and posting for radiation control shall be in accordance with EMRG 1.3/ROI 1.3 and guidance as provided by Radiological Engineering. Zones will be designated by physical barriers such as cones and tape. The area immediately impacted will be declared the Exclusion Zone. This zone is where contamination is either known or expected to occur and where the greatest potential for exposure exists. The Exclusion Zone will encompass a radius of sufficient distance from the product to allow for adequate materials handling and logistical needs prior to decontamination. The outer boundary of the Exclusion Zone is called the Hotline.

Standard 29 CFR 1910.120 (d) requires the following elements in the site control program:

Page 6-1

7.0 DECONTAMINATION PLAN

HSP 18.02, Personnel Contamination Control Requirements for Radiological Controlled Areas, describes requirements for decontamination. The objective of decontamination is to remove hazardous substances (chemical or radiological) from workers and equipment used in hazardous waste operations, to assure compliance with DOE Order 5480.11, Radiological Operating Instructions, and OSHA standard 1910.120, and to preclude the occurrence of related adverse health effects. This chapter specifies decontamination techniques for applicable areas identified in Table 1-1.

7.1 DECONTAMINATION PROCEDURES AND LOCATION

The decontamination process shall take place within the RCA, if applicable (or outside of the contaminated area) in an area identified as the CRZ which consists of the following items:

- Barrier to prevent unauthorized traffic through the area
- Step off pad, decontamination rooms, and ancillary decontamination equipment
- Designated entry and exit to prevent cross contamination

These items are described in the following table:

Task #	Type of Barrier (door, tape, etc.)	Decontamination Equipment	Decontamination Steps
			1. 2. 3. 4. 5. 6.
			1. 2. 3. 4. 5. 6.
			1. 2. 3. 4. 5. 6.
			1. 2. 3. 4. 5. 6.
			1. 2. 3. 4. 5. 6.

Attach additional pages if necessary.

All employees leaving a contaminated area shall be appropriately decontaminated for the suspected contaminants. The extent of decontamination will be dependent on the level of contamination. Doffing procedures must be performed in the order listed to minimize the potential for personnel contamination during the doffing activity.

Decontamination for environmental investigation and restoration activities will take place as described in EMD Operating Procedures, Vol. 1, Field Operations, FO.03, FO.04, FO.07, and FO.12.

Reusable products will be monitored for radiological contaminants and visible contamination to verify that they have been adequately decontaminated. The absence of radiological contamination is defined in HSP 18.10, Release of Property/Waste for Conditional and Unrestricted Use, as per DOE Order 5480.11, and measured with radiation survey instruments capable of detecting Alpha and Beta/Gamma radiation at these levels.

Doffing Procedure

(check all that apply)

[illegible]

Use additional sheets as necessary.

TABLE 7.1

HSP 18.10 Surface Contamination Limits for Unrestricted Release

Radionuclides ²	Average ^{3,4} Total (Fixed Plus Removable) (dpm/100 cm ²) ¹	Maximum Total (Fixed 1 Plus Removable) (dpm/100 cm ²) ¹	Removable ^{1,4,6} (dpm/100 cm ²)
Transuranics, I-125, I-129, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231	100	300	20
Th-Natural, Sr-90, I-126, I- 131, I-133, Ra-223, Ra- 224, U-232, Th-232	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay product, alpha emitters	5,000	15,000	1,000
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above) ⁷	5,000	15,000	1,000

Notes:

- As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- Where surface contamination by both alpha- and beta-gamma radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.
- Measurements of average contamination should not be averaged over an area of more than 1 m². For objects of less surface area, the average should be derived for each object.
- The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively at 1 cm.
- The maximum contamination level applies to an area of not more than 100 cm².
- The amount of removal material per 100 cm² of surface area should be determined by wiping an area of that size with a dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm² is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.
- This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

7.2 DISPOSAL OF DECONTAMINATION EQUIPMENT AND SOLUTIONS

All contaminated clothing and equipment leaving the contaminated area shall be appropriately contained to prevent the spread of the contaminant and shall be properly managed or decontaminated in the appropriate decontamination area.

All wash solutions used for decontamination shall be contained in tubs, pans, four-liter jugs or drums and used as process water. Containers will be designated for process waste use only and will not be used for any other purpose. All solutions shall be sampled for chemical constituents and radiological constituents for proper waste identification and stored or treated per plant policies and RCRA permits.

All wastes collected during decontamination procedures shall be stored and managed according to applicable waste requirements procedures. FO.07 describes the handling of decontamination water and wash water for environmental investigation and restoration projects. FO.06 describes handling of used PPE.

8.0 EMERGENCY RESPONSE

Does a Building Emergency Preparedness Plan exist for this location as proscribed by DOE Order 5500.3A?

() Yes () No If so, include the plan in Table 1-2.

8.1 PRE-EMERGENCY PLANNING

Incidental Release

An incidental release is a release of hazardous substance which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee cleaning it up, nor does it have the potential to become an emergency within a short timeframe. Incidental releases are limited in quantity, exposure potential, or toxicity and present minor safety or health hazards to employees in the immediate work area or those assigned to clean them up.

Releases that Require an Emergency Response Regardless of the Circumstances

There are releases of hazardous substances that pose a significant enough threat to health and safety that, by their very nature, require an emergency response regardless of the circumstances surrounding the release or the mitigating factors. An employer must determine the potential for an emergency in a reasonably predictable worst case scenario [or "anticipated emergencies," 29CFR 1910.120(q)(1)], and plan response procedures accordingly.

Emergency Response

An emergency response includes, but it not limited to, the following situations:

1. The response comes from outside the immediate release area;
2. The release requires evacuation of employees in the area;
3. The release poses, or has the potential to pose, conditions that are IDLH;
4. The release poses a serious threat of fire or explosion (exceeds or has the potential to exceed the LEL or lower flammable limit);
5. The release requires immediate attention because of imminent danger;
6. The release may cause high levels of exposure to toxic substances;
7. There is uncertainty that the employee in the work area can handle the severity of the hazard with the PPE and equipment that has been provided and the exposure limit could easily be exceeded; and
8. The situation is unclear, or data is lacking on important factors.

The purpose of this Emergency Response Plan is to have a detailed pre-determined strategy for handling incidental or emergency incidents and potential problems. This pre-emergency planning will aid in immediate response and abatement of problems and will likely reduce the severity and impact of hazardous situations. The plan is designed to protect site personnel from potential hazards created by an emergency situation. In addition to safeguarding site personnel, the plan is designed to protect plant personnel and the public from contaminants that could potentially move offsite, protect property adjacent to the storage areas from potential hazards within the storage areas, and prevent equipment loss as a result of fire, explosion, or contamination.

8.2 EMERGENCY CONTACT/NOTIFICATION

1. If a release is observed, then the employee observing the release immediately warns coworkers in the contaminated area and notifies supervision.
2. Employees in the area of a release move to a safe location and secure the area to prevent unauthorized personnel from entering the contaminated area.
3. If at any time a potentially life threatening emergency or uncontrolled release exists, then immediately call the RFP emergency number at X2911.

4. If supervision cannot be notified immediately, then the employee continues notifying higher levels of supervision until communication has been achieved with one of the following authorities:
 - Shift Manager
 - Operations Manager or designee
 - Shift Superintendent, X2914
5. The contacted authority ensures that the following notification have been made:
 - a) If a potentially life threatening emergency exists and X2911 has not been called, then immediately call X2911
 - b) If the release contains or potentially contains fissile materials, then immediately contact Nuclear Safety Engineering.
 - c) Notify the Operations Manager.
 If release requires an emergency response, the contacted authority makes the following notifications:
 - a) Request HAZMAT assistance from one of the following organizations:
 - Shift Superintendent X2914
 - Fire Department Dispatch X4337 or X4338
 - b) Promptly report the release to the emergency Operations Center Notification Officer at X3456 and the Shift Superintendent in accordance with 1-100000-HWR.

WARNINGS:

To avoid potential for nuclear criticality, do not collect, control, divert, dam, or otherwise cause liquids containing or potentially containing fissile materials to accumulate.

To avoid the potential of personal injury, only employees trained as a Hazardous Materials Technician may take actions to stop a release requiring an emergency response.

TABLE 8-1
Emergency Numbers

Department/Group	Name	Phone #	Pager #	Home Phone
Shift Superintendent (Incident Commander)		2911		
SSO Officer		7781 or		
H&S Specialist				
HSC		2780		
Occupational Health		2594		
Occupational Safety		2955		
Onsite Supervisor				
Project Manager				
Radiological Engineering		6509		
Radiological Operations		5725		
Operations Manager		5251		
Release, Response & Reporting				
Security		2464		
On-call Waste Regulatory Program Reps				
ERHSO	K. D. Anderson	6979	3296	
HSLO	L. A. Nelowet	5471	3048	
Criticality Safety Eng.				
Facilities Safety Eng.				

If the supervisor is not available or the situation is life threatening, notify RFP emergency response personnel as detailed below.

Call X2911 or radio channel #1 for emergency assistance for life threatening emergencies to access:

- Incident Commander (Shift Supervisor)
- Plant Protection Central Alarm Station
- Fire Department Dispatch Center, and
- Occupational Health

Provide as much detail about the emergency as possible. A decision to dispatch any or all of the following equipment will be made on the information provided:

- Fire Engine/Equipment
- Ambulance
- Hazmat Response Vehicle

Provide the following information, upon request, to the qualified Emergency Dispatcher:

- Exact location of the emergency (nearest road, etc.)
- Nature of the emergency
- Condition of patient if applicable (breathing, consciousness, bleeding, etc.)
- Special hazards in the area
- Your name
- Building number, Cargo number, or Unit number
- Any other information requested

If no details are given, emergency response personnel will respond automatically.

The Incident Commander (IC) will immediately respond to all emergency alerts and alarms. Radio/telephone communications shall be maintained with personnel having access to the plant Public Address System. At his/her discretion, the IC may activate the Emergency Operation Center and notify departments that have an advisory role in the situation. The IC will determine if additional help from offsite agencies (police, hospitals, etc.) is required. The IC will then notify the following groups when appropriate:

Radiological Engineering	Industrial Hygiene	Criticality Safety Engineering
Radiological Operations	Traffic	Facilities Safety Engineering
Occupational Safety	H&S Administrator	Occupational Health
Event Notifications Officer	Hazardous Waste Operations	

Radiological Engineering and Industrial Hygiene will assess any hazards associated with the release of spilled product; Fire Department will be first responders. Hazardous Waste Operations will evaluate the incident for RCRA/CERCLA reporting requirements. Notification shall also be made to Response and Reporting at X7264. Industrial Hygiene and Radiological Engineering shall advise on the type of PPE, including respiratory protection, in the event of an emergency.

8.3 EMERGENCY EQUIPMENT LOCATION

All IHSS/PAC/AAC work sites are equipped with incidental release response equipment; minimum response equipment needed is located in Table 8-2.

TABLE 8-2
Incidental Response Equipment

Check all that apply.

Spill Response Supplies	Location
<input type="checkbox"/> Coveralls (Saranex for acid storage and Tyvek for other operations).	
<input type="checkbox"/> Gloves (Neoprene/Nitrile, leather, surgeons, etc.)	
<input type="checkbox"/> Booties (compatible with spill material)	
<input type="checkbox"/> Tape (2 inch and 6 inch)	
<input type="checkbox"/> Non-sparking tools to seal drums	
<input type="checkbox"/> Disposable wipes	
<input type="checkbox"/> Poly bags	
<input type="checkbox"/> Absorbent (such as Oil-dri)	
<input type="checkbox"/> Broom and dust pan (non-sparking)	
<input type="checkbox"/> Neutralizer (for acid and caustic) (minimum 1 liter of each) ¹	
<input type="checkbox"/> 55-gallon poly bags	
<input type="checkbox"/> Explosion proof wet vacuum pickup	
<input type="checkbox"/> Roll of plastic	
<input type="checkbox"/> Decon solution	
<input type="checkbox"/> Non-sparking shovel	
<input type="checkbox"/> Face shield	
<input type="checkbox"/> Pumps (also include explosion proof)	
<input type="checkbox"/> Extension cords	
<input type="checkbox"/> Generator with Ground Fault Circuit Interrupter	
<input type="checkbox"/> 55-gallon containers (poly, soft steel, or 6D as needed)	
<input type="checkbox"/> 85-gallon containers (poly, soft steel, or 6D as needed).	
<input type="checkbox"/> Universal absorbent pillows, mats, socks, booms ²	
<input type="checkbox"/> Acid or caustic absorbent pillows, mats, socks, booms ²	
<input type="checkbox"/> Oil or coolant absorbent pillows, mats, socks, booms ²	
<input type="checkbox"/> Oil skimming mats, sheets, booms ²	

1- Industrial Hygiene will approve any neutralizing materials that may be acquired.

2 - The materials indicated may not be allowed in Radiation Controlled Areas or where fissile material is present. Contact Facility Safety Engineering to evaluate the acceptability of any equipment or supplies.

8.4 SPILL RESPONSE & CONTROL PROCEDURES

Spill response procedures are described in HSP 21.04, Emergency Response and Spill Control, and in Hazardous Waste Requirements Manual (HWRM) Section 4.

ALL POTENTIALLY UNCONTROLLED SPILLS SHALL BE REPORTED TO THE EMERGENCY COORDINATOR AT X2911 OR RADIO CHANNEL #1.

Incidental spill response procedures: _____

8.5 FIRE OR EXPLOSION RESPONSE

Notify the Fire Department in the event of a fire, no matter how minor. REPORT FIRES AND EXPLOSIONS TO X2911 OR RADIO CHANNEL #1. Contact area supervisor after calling X2911.

Other fire response procedures: _____

Contacted authority (supervisor, etc.) must also ensure SS or EOC Notification Officer notifies on-call WRP representative.

8.5.1 Post-Emergency Response

Equipment will be decontaminated at the Decontamination Facility or by wiping with a soap solution. Non-reusable items used for decontamination and decontamination wash water will be handled using FO.03, FO.04, FO.06, and FO.07. Emergency equipment will be restocked.

8.6 EVACUATION PLAN

Personnel and visitors to this HWA will not respond to the incident and will evacuate the areas if any of the following occur:

- Fire, explosion
- Spill
- If instructed by the Life Safety/Disaster Warning (LS/DW) Public Address System
- If instructed by site supervision
- Other _____

Assembly areas are taught in the site briefings and are shown in Appendix F. After an evacuation the supervisor is required to verify that all employees under his/her supervision are accounted for.

REFERENCES

9.1 FEDERAL AND STATE REGULATIONS

Title 29 Code of Federal Regulations, Parts 1920.1000 through 1910.1048 (Subpart Z), "Toxic and Hazardous Substances"
Code of Federal Regulations, Part 1910.120, "Hazardous Waste Operations and Emergency Response"
Code of Federal Regulations, Part 1910, "Occupational Safety and Health Standards for General Industry"
Code of Federal Regulations, Part 1926, "Safety and Health Regulations for Construction"

Title 40 Code of Federal Regulations, Parts 260-270, "Hazardous Waste Management System"

Title 49 Code of Federal Regulations, Transportation

NIOSH Occupational Safety and Health Guidance for Hazardous Waste Site Activities, US Department of Health and Human Services, National Institute of Occupational Safety and Health (NIOSH), October 1985
Threshold Limit Values and Biological Exposure Indices for 1990-1991, American Conference of Governmental Industrial Hygienists, 1990

9.2 DEPARTMENT OF ENERGY ORDERS

5400.1 "General Environmental Protection Plan"
5480.11 "Radiation Protection for Occupational Workers"
5480.19 "Conduct of Operations"
5480.6 "Radiological Control Manual"

9.3 ROCKY FLATS PLANT MANUALS

COOP Conduct of Operations
EMD Operating Procedures, Vol. 1
Environmental Management Radiological Guidelines
EMRG Environmental Management Radiological Guidelines
FO EMD Operating Procedures, Volume I: Field Operations
HSP EG&G Rocky Flats Plant (RFP) Health and Safety Practices Manual
HWRM Hazardous Waste Requirements Manual
ROI Radiological Operating Instructions
WRM Waste Requirements Manual
WRPM Waste Requirements Procedures Manual

APPENDIX A
VISITOR LOG
(Appendix A is found in Excel titled "Appendix A")



[illegible]

APPENDIX B
LINES OF RESPONSIBILITY

(Insert Organization Chart for Project Personnel
include Project Management, Field Personnel, ERHSO, HSC, HSLO, SSO and HSS/HSST)

APPENDIX C
CHEMICAL HAZARDS
For known contaminants of concern

(Appendix C is found in Excel titled "Appendix C")

Appendix C

Chemical Hazards Posed by Site Contaminants and Route of Exposure

Tasks Involving Contaminant	Maximum Expected Concentration (a) air or other medium (specify)	Contaminant (Synonyms) (Abbreviations)	OSHA PEL, ACGIH TLV or NIOSH REL <IDLH>	Hazard Type	Physical/Chemical Characteristics	Routes of Exposure	Exposure Symptoms/Target Organs
		Acetone	750 ppm NIOSH 250 ppm	VOC Fire	Colorless liquid with a fragrant mint-like odor. Fl pt 0 F LEL: 2.5% UEL: 13% VP: 180 mm Hg (@ 77 F)	Inhalation Ingestion Contact	Eye, nose, and throat irritation; headache; dizziness; dermatitis <respiratory system, skin>
		Aluminum	<20,000 ppm> 10 mg/m3 (Total) 5 mg/m3 (Respirable) <NA>	Toxic	Silvery ductile metal	Inhalation	Pulmonary fibrosis, possibly Alzheimer's
		Ammonia	35 ppm (st) NIOSH 25 ppm <500 ppm>	Corrosive	Colorless gas with pungent, suffocating odor	Inhalation Ingestion Contact	Eye, nose, throat irritation; chest pain, difficulty breathing; skin burns <respiratory system, eyes>
		Antimony	0.5 mg/m3 <80 mg/m3>	Toxic	Silvery white metal	Inhalation Contact	Irritates eyes, nose, throat; cramps, vomiting, diarrhea; affects sleep and appetite <respiratory system>
		Arsenic	0.010 mg/m3 NIOSH .002 mg/m3 (ceiling) <100 mg/m3>	Carcinogen Toxic	Silver-gray or tin-white brittle, odorless solid	Inhalation Absorption Contact Ingestion	Nasal ulceration; GI disturbances; respiratory irritation <Liver, kidneys, skin, lungs, lymphatic system>
		Barium	0.5 mg/m3 <1,100 mg/m3>	Toxic	White, odorless solid	Inhalation Ingestion Contact	Irritates eyes, nose, throat, upper respiratory; GI; muscle spasm; slow pulse; skin burns <Heart, CNS, skin, respiratory system, eyes>
		Beryllium	0.002 mg/m3 NIOSH .0005 mg/m3 <10 mg/m3>	Carcinogen Toxic	Metal: a hard, brittle, grey-white solid; noncombustible; slight explosion hazard in dust or powder form	Inhalation	Respiratory symptoms; fatigue, weakness; weight loss <Lungs, skin, eyes>

**S* denote potential significant hazard from skin exposure.

Task Involving Contaminant	Maximum Expected Concentration (a) air or other medium (specify)	Contaminant (Synonyms) (Abbreviations)	OSHA PEL, ACGIH TLV or NIOSH REL <IDLH>	Hazard Type	Physical/Chemical Characteristics	Routes of Exposure	Exposure Symptoms/ <Target Organs>
		Cadmium Dust	0.2 mg/m3 <50 mg/m3>	Carcinogen Toxic	Silver-white, blue tinged lustrous, odorless solid	Inhalation Ingestion	Pulmonary edema; cough, light chest; chills; muscle aches; nausea, vomiting, diarrhea <Respiratory system, kidneys, prostate, blood>
		Carbon Disulfide (Carbon Bisulfide)	4 ppm, NIOSH 1 ppm *S* <500 ppm>	VOC Fire	Colorless to faint yellow liquid with sweet ether-like odor LEL: 1.3% UEL: 50%	Inhalation Ingestion Absorption Contact	Dizziness; headache, fatigue, poor sleep, nervousness, psychosis, coronary heart disease, gastritis, eye and skin burns <CNS, PNS, CVS, eyes, kidneys, liver, skin>
		Carbon Tetrachloride (Tetrachloromethane)	2 ppm <300 ppm>	Carcinogen VOC	Colorless liquid, ether-like odor, not combustible. VP: 91 mm Hg	Inhalation Ingestion Absorption Contact	CNS depression, nausea and vomiting, liver and kidney damage, skin irritation <CNS, eyes, lungs, liver, kidneys, skin>
		Chromium	0.5 mg/m3 <No evidence>	Carcinogen Toxic	Blue-white to steel-gray, lustrous, brittle, hard solid	Inhalation Ingestion	Corrosive to skin and mucous membranes; carcinogen of the lungs, nasal cavity, stomach, larynx
		Copper	1 mg/m3 <No evidence>	Toxic	Reddish, lustrous malleable odorless solid	Inhalation Ingestion Contact	Irritation of eyes and mucous membranes, pharynx; poison by ingestion; metal taste <respiratory system, kidneys, liver>
		1,1-Dichloroethane	100 ppm <4,000 ppm>	VOC Fire	Colorless, oily liquid with a chloroform-like odor	Inhalation Ingestion Contact	CNS depression, skin irritation <skin, liver, kidneys>
		1,2-Dichloroethylene (Acetylene Dichloride)	200 ppm <4,000 ppm>	VOC Fire	Colorless liquid with slightly acid, chloroform-like odor. LEL: 5.6% UEL: 12.8%	Inhalation Ingestion Contact	Eye irritation, CNS depression <respiratory system, eyes, CNS>

Tasks Involving Contaminant	Maximum Expected Concentration (a) air or other medium (specify)	Contaminant (Synonyms) (Abbreviations)	OSHA PEL, ACGIH TLV or NIOSH REL <IDLH>	Hazard Type	Physical/Chemical Characteristics	Routes of Exposure	Exposure Symptoms/ <Target Organs>
		1,1-Dichloroethylene (Vinylidene chloride) (1,1-Dichloroethene) (1,1-DCE)	1 ppm	VOC Fire	Colorless liquid, mild sweet odor LEL: 7.3% UEL: 16%	Inhalation Ingestion Contact	Liver and kidney changes
		Freon 113 (1,1,2-Trichloro - 1,2,2-Trifluoroethane) (Chlorofluorocarbon 113)	1000 ppm 1250 ppm(st) <4500>	Toxic	Colorless to water-white liquid with an odor like carbon tetrachloride at high concentrations BP: 118F	Inhalation Ingestion Contact	Irritates throat, drowsiness, dermatitis <skin, heart>
		Hexane	50 ppm <5000 ppm>	Fire	Colorless liquid w/gasoline like odor LEL: 1.1% UEL: 7.5%	Inhalation Ingestion Contact	Light headedness, nausea, headache, numb extremities Irritates eyes, nose, dermatitis <skin, eyes, resp. sys>
		Hydrochloric Acid	5 ppm ceiling (7 mg/m3) <100 ppm>	Corrosive	Colorless liquid	Inhalation Ingestion Contact	Nose and throat irritation; burns throat and eyes; cough, choking <respiratory system, skin, eyes>
		Hydrogen Cyanide	4.7 ppm (st) *S* <5 mg/m3>	Fire Toxic	Colorless or pale blue liquid or gas with bitter almond-like odor BP 78 F, LEL 5.6% UEL 40%	Inhalation Absorption Ingestion Contact	Asphyxiation and death at high levels; weak, headache, nausea, vomiting, respiration slow and gasping <CNS, CVS, liver, kidneys>
		Hydrogen Peroxide	1 ppm <75 ppm>	Corrosive	Colorless liquid with a slightly sharp odor; noncombustible, powerful oxidizer	Inhalation Ingestion Contact	Eye, nose, and throat irritation; corneal ulcer <respiratory system, skin, eyes>
		Isopropanol (Isopropyl Alcohol)	400 ppm ppm (st) <12,000 ppm>		Colorless liquid with the odor of rubbing alcohol F1 pt: 53F BP: 181F 2% UEL: 12.7%	Inhalation Ingestion Contact	Mild irritation to eyes, nose, throat; drowsiness, dizziness; dry cracking skin <eyes, skin, respiratory system>

Tasks Involving Contaminant	Maximum Expected Concentration (a) air or other medium (specify)	Contaminant (Synonyms) (Abbreviations)	OSHA PEL, ACGIH TLV or NIOSH REL <DLH>	Hazard Type	Physical/Chemical Characteristics	Routes of Exposure	Exposure Symptoms/Target Organs
		Lead	0.050 mg/m3 <700 mg/m3>	Toxic	Heavy, ductile, gray, soft metal	Inhalation Ingestion Contact	Weakness, insomnia, nervous irritability, tremors, muscle pain <CNS, PNS, GI tract, blood, kidneys>
		Lithium Hydride	0.025 mg/m3 <55 mg/m3>	Fire	Silver-colored light metal	Inhalation Ingestion	Reacts with body moisture to cause burns <CNS, skin, eyes>
		Manganese	5 mg/m3 <No evidence>		Silvery or reddish gray solid; lustrous, brittle; combustible	Inhalation Ingestion	Parkinson's-type symptoms; sleepiness; vomiting; weakness; tremors <CNS, lungs>
		Mercury	0.01 mg/m3 "S" <10 mg/m3>		Silver-white, mobile, heavy, odorless liquid	Inhalation Contact Absorption	Eye and skin irritant; poison by inhalation; cough, tremor, headache, irritability <GI tract, CNS>
		Methanol (Methyl Alcohol) (Wood Alcohol)	200 ppm 250 ppm (st), "S" <25,000 ppm>		Colorless liquid with a characteristic pungent odor pt: 52F BP: 21F LEL: 6% UEL: 36%	Inhalation Ingestion Absorption Contact	Mild irritation to eyes and upper respiratory, skin irritation <eyes, skin, CNS, GI tract>
		Methyl Ethyl Ketone (MEK)	200 ppm 300 ppm (st) <3000 ppm>		Colorless liquid with a moderately sharp, fragrant mint or acetone-like odor pt: 16F BP: 175F LEL: 1.4% UEL: 1.4%	Inhalation Ingestion Contact	Irritates eyes, nose, headache, dizziness, vomiting <CNS, lungs>
		Methylene Chloride (Dichloromethane) (Methylene Dichloride)	50 ppm <5,000 ppm>	Carcinogen VOC	Colorless liquid with chloroform-like odor BP: 104 F LEL: 14% UEL: 22%	Inhalation Ingestion Contact	Fatigue, weakness, sleepiness, lightheadedness, numbness and tingling in limbs, nausea, eye and skin irritation <CNS, CVS, eyes, skin>

"S" denote potential significant hazard from skin exposure.

Tasks Involving Contaminant	Maximum Expected Concentration (a) air or other medium (specify)	Contaminant (Synonyms) (Abbreviations)	OSHA PEL, ACGIH TLV or NIOSH REL <DLH>	Hazard Type	Physical/Chemical Characteristics	Routes of Exposure	Exposure Symptoms/ <Target Organs>
		Molybdenum	10 mg/m3 (Insoluble) <No evidence>	Toxic	Dark gray or black powder with a metallic luster	Inhalation Ingestion	Irritates eyes, nose, and throat; diarrhea, listlessness <kidneys, respiratory system, blood>
		Nickel	1 mg/m3 (Insoluble) 0.1 mg/m3 (Soluble) <No evidence>	Carcinogen Toxic	Silvery-white, hard, malleable, and ductile metal	Inhalation Ingestion Contact	Nasal, lung, and skin irritant; carcinogenic <respiratory system, CNS>
		Selenium	0.2 mg/m3 <Unknown>	Toxic	Steel gray, nonmetallic element; combustible	Inhalation Absorption Ingestion Contact	Irritated eyes, nose, throat; GI distress; chills; headache; garlic breath <upper respiratory system, skin, liver, kidneys, blood>
		Silver	0.01 mg/m3 <No evidence>	Toxic	White, lustrous solid metal	Inhalation Ingestion Contact	Blue-gray eyes, skin irritation, ulceration; GI distress <nasal septum, skin, eyes>
		Sodium Hydroxide (Caustic Soda) (Lye)	2 mg/m3 ceiling <250 mg/m3>	Corrosive	White, odorless solid before mixing; disagreeable, sweet odor in solution	Inhalation Ingestion Contact	Severe skin irritation; nose irritation; temporary loss of hair <eyes, respiratory system, skin>
		Stoddard Solvent (Mineral Spirits) (Petroleum Solvent)	<29500 mg/m3>	Carcinogen VOC	Colorless liquid with sweet odor; not combustible. VP: 14 mm Hg	Inhalation Ingestion Contact	Eye, nose, throat irritation; nausea; flushed face; vertigo, headache <liver, kidneys, CNS, upper respiratory system>
		Tetrachloroethylene (Perchloroethylene)	25 ppm <500 ppm>	Carcinogen VOC	Colorless liquid with sweet odor; not combustible. VP: 14 mm Hg	Inhalation Ingestion Contact	Eye, nose, throat irritation; nausea; flushed face; vertigo, headache <liver, kidneys, CNS, upper respiratory system>

Taste Involving Contaminant	Maximum Expected Concentration (a) air or other medium (specify)	Contaminant (Synonyms) (Abbreviations)	OSHA PEL, ACGIH TLV or NIOSH REL <IDLH>	Hazard Type	Physical/Chemical Characteristics	Routes of Exposure	Exposure Symptoms/Target Organs
		Thallium	0.1 mg/m3 (Soluble) *S* <20 mg/m3>	Toxic	Depends upon specific compound	Inhalation Ingestion Absorption Contact	Nausea, diarrhea, abdominal pain, vomiting; ptoxis, strabismus; tremor; chest pain, pulmonary edema <eyes, CNS, lungs, liver, kidneys, GI tract, body hair>
		Toluene (Methyl Benzene) (Methyl Benzol)	100 ppm 150 ppm (st) <2,000 ppm>	VOC Fire	Colorless liquid with a sweet, pungent benzene-like odor. LEL: 1.2% UEL: 7.1%	Inhalation Ingestion Absorption Contact	Fatigue, weakness, confusion, dizziness, headache; dilated pupils, nervousness, insomnia <CNS, liver, kidneys, skin>
		1,1,1-Trichloroethane (Methyl Chloroform) (1,1,1-TCA)	350 ppm 450 ppm (st) <1,000 ppm>	VOC	Colorless liquid, mild sweet chloroform-like odor. LEL: 7.5% UEL: 12.5%	Inhalation Ingestion Contact	Eye and skin irritation, dermatitis, headache, drowsiness <CNS, liver, kidneys>
		1,1,2-Trichloroethane	10 ppm *S* <500 ppm>	Carcinogen VOC	Colorless liquid with a chloroform-like odor, non-combustible	Inhalation Ingestion Absorption Contact	Irritates eyes, nose, throat; CNS depression <CNS, liver, kidneys>
		Trichloroethylene (Ethylene Trichloride) (Trichloroethene) (TCE)	50 ppm NIOSH 25 ppm <1,000 ppm>	Carcinogen VOC Fire	Colorless liquid, sweet odor. LEL: 8% UEL: 10.5%	Inhalation Ingestion Contact	Headache, vertigo, visual disturbance; vomiting, nausea; eye and skin irritation <respiratory system, heart, liver, kidneys, CNS, skin>
		Xylenes	100 ppm 150 ppm (st) <1000 ppm>		Colorless liquids with an aromatic odor	Inhalation Ingestion Absorption Contact	Dizziness, excitement, drowsiness; irritates eyes, nose, throat; nausea, vomiting, abdominal pain; dermatitis <CNS, eyes, GI tract, blood, liver, kidneys, skin>

Tasks Involving Contaminant	Maximum Expected Concentration (a) air or other medium (specify)	Contaminant (Synonyms) (Abbreviations)	OSHA PEL, ACGIH TLV or NIOSH REL <IDLH>	Hazard Type	Physical/Chemical Characteristics	Routes of Exposure	Exposure Symptoms/Target Organs
		Americium	N/A 1.0 rem/yr, RFP	Carcinogen		Penetration Inhalation Ingestion Absorption Injection	Blood cell changes, hair loss, burns, nausea, vomiting <respiratory system, liver, bone marrow, blood> None detectable at concentrations expected.
		Plutonium	N/A 1.0 rem/yr, RFP	Carcinogen	Radiation source	Penetration Inhalation Ingestion Absorption Injection	Blood cell changes, hair loss, burns, nausea, vomiting <respiratory system, liver, bone marrow, blood> None detectable at concentrations expected.
		Uranium	Soluble 0.05 mg/m ³ Insoluble mg/m ³ mg/m ³ > rem/yr, RFP 0.2 <20 1.0	Carcinogen	Combustible solid (insoluble) radiation source	Penetration Inhalation Ingestion Absorption Contact	Blood cell changes, hair loss, burns, nausea, vomiting <respiratory system, liver, bone marrow, blood> None detectable at concentrations expected.

KEY:

ACGIH	American Conference of Governmental Industrial Hygienists
BP	Boiling point
CNS	Central nervous system
FI pt	Flash point - closed cup, unless otherwise noted
IDLH	Immediately Dangerous to Life and Health - Maximum concentration from which one could escape within 30 minutes without experiencing any irreversible health effects
LEL	Lower explosive limit
mg/m ³	Milligrams per cubic meter
NA	Not applicable
OSHA	Occupational Safety and Health Administration
PEL	Permissible exposure limit - Concentration that nearly all workers may be repeatedly exposed, day after day, without adverse effect. (Based on an 8-hour workday and 40-hour workweek).
ppm	Parts per million
st	15 minute short term exposure limit
TLV	Threshold limit value - Concentration that nearly all workers may be repeatedly exposed, day after day, without adverse effect. (Based on an 8-hour workday and 40-hour workweek).
UEL	Upper explosive limit
ug/m ³	Micrograms per cubic meter
VP	Vapor pressure at 68 F in millimeters (mm) mercury (Hg) unless otherwise noted.

REFERENCES:

Air Contaminants - Permissible Exposure Limits (29 CFR 1910.1000)
American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1990 to 1991
National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, June 1990
Sax, N. Irving, Dangerous Properties of Industrial Materials, Van Nostrand Reinhold Company, New York, 1979

APPENDIX D
SUBCONTRACTOR RESPIRATORY PROTECTION PROGRAM

APPENDIX E
INVOLVED PERSONNEL
(EG&G Only)

The Operations Manager should update this list and forward a copy to Occupational Health on an annual basis and any time employees are added or removed from this list.

Date of Last Update:

List all personnel performing "hands-on" work in each task. Also identify whether each employee listed is a "hazardous waste worker" for medical surveillance purposes. A "hazardous waste worker" for medical surveillance is NOT any person who handles hazardous waste. Per OSHA requirements (29 CFR 1910.120), a "hazardous waste worker" for purposes of medical surveillance is:

- potentially exposed to hazardous materials above the published exposure standards without regard to respiratory protection for 30 or more days per year, OR
- engaged in hazardous waste activities and wears a respirator for 30 days or more per year, OR
- injured, becomes ill or develops signs or symptoms due to possible overexposure involving hazardous substances from an emergency response or hazardous waste operations, OR
- a member of the HAZMAT team.

[illegible]

APPENDIX F
SITE MAPS FOR PROJECT SITES

APPENDIX G
LOCATION OF MEDICAL ASSISTANCE

For emergency medical assistance call Extension 2911

**INSTRUCTIONS
FOR
COMPLETION OF THE
HEALTH AND SAFETY PLAN
USING THE
ROCKY FLATS PLANT
HASP TEMPLATE**

**INSTRUCTIONS FOR COMPLETION OF HEALTH AND SAFETY PLAN
USING THE ROCKY FLATS PLANT
HASP TEMPLATE
ENVIRONMENTAL RESTORATION MANAGEMENT**

TABLE 1-1

Identifies the HWA's addressed by the HASP.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Building or Location	Building or location of HWA	
2	IHSS/PAC/etc.	IHSS/PAC or other identifying number	Environmental Restoration Project Management
3	IHSS/PAC/etc. Name	Descriptive name of waste area	See above

TABLE 1-2

Lists location of documents which are referenced in the HASP. These documents should be conveniently located near the HASP.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Document	Check box and enter name or identifying number of all documents including SOP's which are referenced in the HASP.	
2	Location	Location (ex. room number) of referenced document	

TABLE 1-3

Lists minimum training, personal protective equipment, and medical surveillance requirements for visitors to enter the HWA or a specific process area of the HWA. Visitors, by definition, do not perform hands-on work.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1 - 2	EZ or SZ	Check either Exclusion Zone or Support Zone as applicable.	Industrial Hygiene or Radiological Engineering
3	Location	Location such as specific process areas have separate visitor entry requirements, then list each subarea.	Table 1-1
4	Minimum entry	PPE and training requirements for visitors to enter an area, but not perform hands-on work.	

TABLE 1-4

Provides a description of each RCRA Unit covered by this HASP.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	IHSS/PAC/etc.	ID number or name	Table 1-1
2	Description	General description IHSS, etc.	Process knowledge, Historical Release Report, historical data

TABLE 2-1

Assigns task numbers to each discrete task at the HWA's covered by this HASP. Tasks are described and broken down into steps.

<u>Column/</u> <u>Row</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1 / 1	Task #	Identifying number assigned in increasing order starting with number 1.	
2 / 1	Task Title	Expected tasks at this HWA. Tasks are multi-step jobs with similar hazards, ex. "sampling waste solvent drums".	Process knowledge
3 / 1	SOP/OSA	List OSA or SOP if one already exists for the task.	
4 / 1	Task Description	Describe the general objective of the task.	Process knowledge
5 / 1	Task Steps	In order to identify task hazards, break task into individual steps required to complete the task, ex. position local ventilation, move drums into position, open drums, sample waste, reseal drums, etc.	Process knowledge
1 / 2	IHSS/PAC/AAC etc.	IHSS/PAC/AAC or other identifying information	Table 1-1

TABLE 2-2

The five tables associated with table 2-2 describe the hazards associated with each task. The five tables 2-2.1 through 2-2.5 must be completed **separately** for each task. If any section of Table 2-2 is not applicable, that section should be marked "N/A".

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1		Task number from Table 2-1	Table 2-1
2		Task title from Table 2-1	Table 2-1
3		IHSS #(s) where task is to be performed (or AAC, PAC, etc.)	

TABLE 2-2.1

Describes radiological hazards of specific task. Enter footnote (1) for anticipated contamination, footnote (2) for previously measured contamination.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Isotope Present	All isotopes which present a potential hazard during the task	WSRIC, WEMS, analytical data
2	Medium	Soil, sludge, groundwater, or other medium containing radiological hazards	
3	% DAC	Average % DAC measured during task, or range of % DAC measured	Historical data
4	Fixed Contamination	Average or range of fixed contamination measured in area of task, specify contamination area, ex. floor area NW corner	
5	Removable Contamination	Average or range of removable contamination measured in area of task	
6	Dose Rate Neutron	Neutron dose rate measured in task area	
7	Dose Rate Beta/Gamma	Beta/Gamma dose rate measured in task area	

TABLE 2-2.2

Describes chemical (non-radiological) hazards of specific task. Appendix C is used to identify all chemicals of concern associated with each task. The information from Appendix C is then used to complete this table.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Hazard Type	Check all that apply as identified by column 5 of Appendix C.	Appendix C
2	Concentrations	Check the applicable box to indicate likelihood of a potentially hazardous concentration of chemical. Potentially hazardous concentrations might include 1/2 the Permissible Exposure Limits, or 10% of the Lower Explosive Limit.	Appendix C and Industrial Hygiene
3	Job Duty	Specify job duty of individual(s) potentially exposed to chemical, ex. air monitor vs. waste handler.	
4	Routes of Exposure	Enter I, B, F, H, and/or O to indicate the method by which someone performing the task might be exposed to the chemical.	Process knowledge

TABLE 2-2.3

Describes biological hazards and controls associated with specific task.

<u>Row</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Checkbox	Check box to indicate if biological hazards such as stinging insects or infectious viruses are associated with this task.	Process knowledge
2	Describe	Describe biological hazards associated with task	Process knowledge
3	Controls	Describe control measures for each biological hazard	Industrial Hygiene

TABLE 2-2.4

Lists confined space that may be entered during task.

<u>Row</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Confined space	List all confined spaces that may be entered as part of the task	Process knowledge, Industrial Hygiene database

TABLE 2-2.5

List physical hazards and controls associated with specific task.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Hazard	Check all physical hazards that apply to the task. Briefly describe the hazard.	Process knowledge
2	HSP Section	If applicable, cite HSP section which addresses the listed hazard	HSP
3	Controls	Describe specific control measures for listed hazard	Occupational Safety and Industrial Hygiene

DONNING PROCEDURE

For each task, list the elements of the standard donning procedure that apply. Add additional sheets as necessary.

PPE INSPECTION CHECKLIST

Check the elements of the standard PPE Inspection Checklist which apply.

TABLE 3-1

The five tables associated with table 3-1 describe the hazard controls associated with each task. The five tables 3-1.1 through 3-1.5 must be completed **separately** for each task. If any section of Table 3-1 is not applicable to a task, that section should be marked N/A.

TABLE 3-1.1

Lists Radiological Postings required in the task area. These postings should be selected by Radiological Engineering.

<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
Radiological Postings Required	Check all radiological postings required in the task area. task area.	Radiological Engineering

TABLE 3-1.2

Lists Radiological monitoring required in the task area. Monitoring frequency must concur with RWP.

<u>Row</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Routine Contamination Survey	List frequency type and type of equipment to be used for routine contamination survey, if required during task.	Radiological Engineering
2	Routine Radiation Survey	List frequency type and type of equipment to be used for routine radiation survey, if required during task.	Radiological Engineering
3	Continuous Monitoring	List type(s) and equipment to be used for continuous monitoring, if required during task. (ex. SAAM, TLD, etc.)	Radiological Engineering

TABLE 3-1.3

Lists Engineering or Administrative controls required during the task to minimize hazardous exposure to radiological or non-rad hazards. Must concur with RWP.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Controls Employed	Check box to indicate engineering or administrative controls to be employed during task.	Radiological Engineering and Industrial Hygiene
2	Describe	For checked boxes, describe engineering or administrative controls to be employed during task.	Radiological Engineering and Industrial Hygiene

TABLE 3-1.4

Describes monitoring requirements for non-radiological chemicals associated with the specific task.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Contaminant	List contaminant or contaminant class which will be monitored.	Industrial Hygiene
2	Type	List either real time instrument or Analytical method to be employed to monitor for contaminant.	Industrial Hygiene
3	Frequency/ Locations	Specify frequency and location of sampling, ex. during sampling in worker breathing zone.	Industrial Hygiene
4 - 5 Row 1	Action	Specify action levels for particular monitoring method and contaminant	Industrial Hygiene
4 - 5	Action	Describe action to be taken if monitoring indicates that action level has been exceeded	Industrial Hygiene

TABLE 3-1.5

Describes PPE requirements for radiological or non-radiological chemicals associated with the specific task.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Job Duty	Specify job duty of individual to wear listed PPE, ex. air monitor vs. waste handler.	Industrial Hygiene & Radiological Engineering
2	Safety Shoes & Safety Glasses	Check box if safety shoes and safety glasses are required.	Industrial Hygiene & Radiological Engineering
3	Body Covering Type	Specify required body covering during task, ex. Tyvek, white coveralls, Saranex, etc.	Industrial Hygiene & Radiological Engineering
4	Glove Type	Specify glove material required during task, ex. butyl rubber, nitrile, natural rubber, etc.	Industrial Hygiene & Radiological Engineering
5	Respirator Type	Specify full-face, half-mask, supplied-air, SCBA, etc.	Industrial Hygiene & Radiological Engineering
6	Other		Industrial Hygiene & Radiological Engineering

PERSONNEL HEALTH AND SAFETY TRAINING REQUIREMENTS

For each task, mark the box for each training course which is required. Boxes should be marked with an "A" if the training is required to enter the task area; marked with a "B" if the training is required to enter a controlled area without performing any hands-on work; or marked with a "C" if the training is required to perform hands-on work in a controlled area.

TABLE 5-0

Lists task specific medical monitoring which may be required in addition to the annual or biennial medical surveillance for hazardous waste workers.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Task	From Table 2-1	Table 2-1
2	Hazardous Substance for Medical Monitoring	Specific chemical substance to be monitored for	Occupational Health, Radiological Engineering or Industrial Hygiene
3	Medical Monitoring	Include determinant (chemical substance or metabolite) and whether measurement is made in exhaled air, blood, urine or other biological specimen.	Occupational Health, Radiological Engineering or Industrial Hygiene
4	Sampling Time	Prior, during or end of shift, beginning or end of work week, or other time for sampling.	Occupational Health, Radiological Engineering or Industrial Hygiene

SITE CONTROL MEASURES

Check boxes as applicable under site communications to identify those communication measures which are available in the HWA. Include locations for alarm pull box, telephone, and fire phone as applicable.

DECONTAMINATION

This table describes decontamination procedures and equipment.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Task #	List applicable task numbers.	Radiological Engineering and Industrial Hygiene
2	Type of Barrier	Describe how decontamination area will be separated from contamination area and clean area.	Radiological Engineering and Industrial Hygiene
3	Decontamination Equipment	Describe equipment that may be necessary for decontamination for specific task.	Radiological Engineering and Industrial Hygiene
4	Decontamination Steps	Describe each step for decontamination including contaminant screening.	Radiological Engineering and Industrial Hygiene

DOFFING PROCEDURE

For each task, list the elements of the standard doffing procedure that apply. Add additional sheets as necessary.

TABLE 8-1

List all applicable emergency telephone and pager numbers for emergency and supervisory personnel at the HWA.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Department	Responsible department or group	
2	Name	Name of responsible individual	Originating department
3 - 4 - 5	Phone, pager and home phone	Applicable telephone and digital pager numbers	Telephone directory and individual personnel

TABLE 8-2

Lists incidental release response supplies that must be maintained at the HWA.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Spill Response Supplies	Check all supplies that must be maintained at the HWA for spill response.	Fire department, Industrial Hygiene
2	Location	Specific location (ex. room number) of spill response supplies	

SPILL RESPONSE PROCEDURES

List spill response procedures specific to the HWA if different than those listed.

FIRE OR EXPLOSION RESPONSE

List fire or explosion response procedures specific to the HWA if different than those listed.

APPENDIX B

Insert organization chart(s) for responsible personnel at the HWA from the Operations Manager to the foreman level. Include titles and names.

APPENDIX C

identifies the hazardous properties, exposure limits and routes of exposure for chemicals associated with each task.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Tasks	Task number that involves potential exposure to the contaminant.	WSRIC, Process knowledge
2	Max. Expected Concentration	Concentration of contaminant as previously measured in air or in the waste.	
3	Contaminant (Synonyms) (Abbreviations)		Per Industrial Hygiene
4	OSHA PEL, ACGIH TLV, or NIOSH REL <IDLH>		Per Industrial Hygiene
5	Hazard Type		Per Industrial Hygiene
6	Physical/Chemical Characteristics		Per Industrial Hygiene
7	Routes of Exposure		Per Industrial Hygiene
8	Exposure Symptoms <Target Organs>		Per Industrial Hygiene

APPENDIX D

If subcontractor not using the EG&G Respiratory Protection Program, include the subcontractor's Respiratory Protection Program in Appendix D.

APPENDIX E

List all personnel involved in tasks at the HWA. Also identifies whether each employee is a "hazardous waste worker" per OSHA definition for medical surveillance purposes.

<u>Column</u>	<u>Title</u>	<u>Information to be Entered</u>	<u>Information Available From:</u>
1	Hazardous Waste Worker	Check box according to criteria established in beginning of Appendix E. Note: All employees working at the HWA are NOT necessarily "hazardous waste workers" according to the requirements.	Requirements listed in Appendix E
2	Name	Employee first two initials and last (family) name.	
3	Employee #	EG&G ID number or social security number	
4	Involved Tasks	Task numbers for all tasks in which employee is involved.	

APPENDIX F

Include site maps that clearly show the layout of the HWA, and the location of the HWA(s) on the Rocky Flats plantsite. Separate maps can be attached.

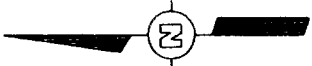
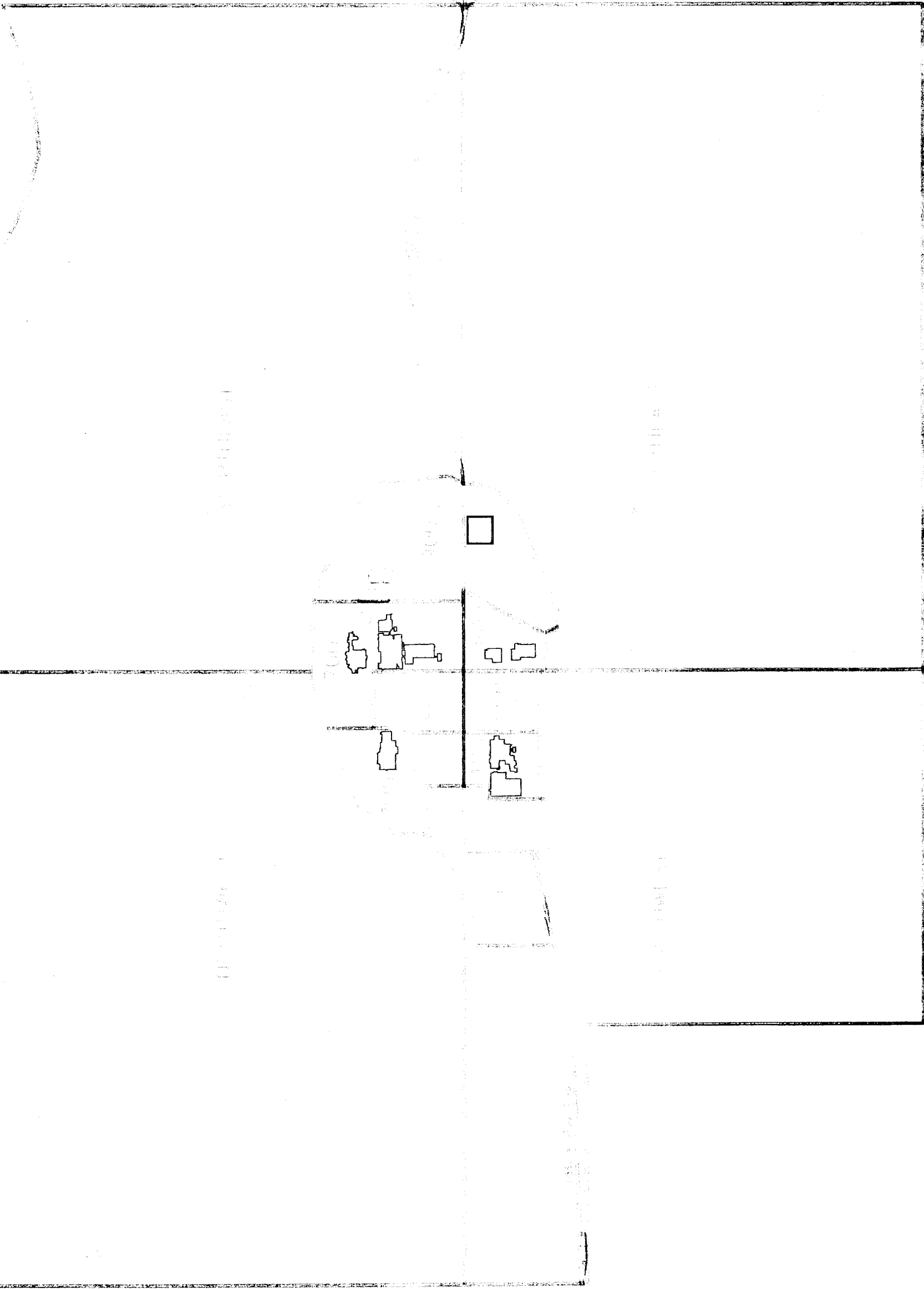
APPENDIX G

Attach a map that clearly shows the route from the HWA(s) to Building 122, Occupational Health. Street names should be designated on the map.

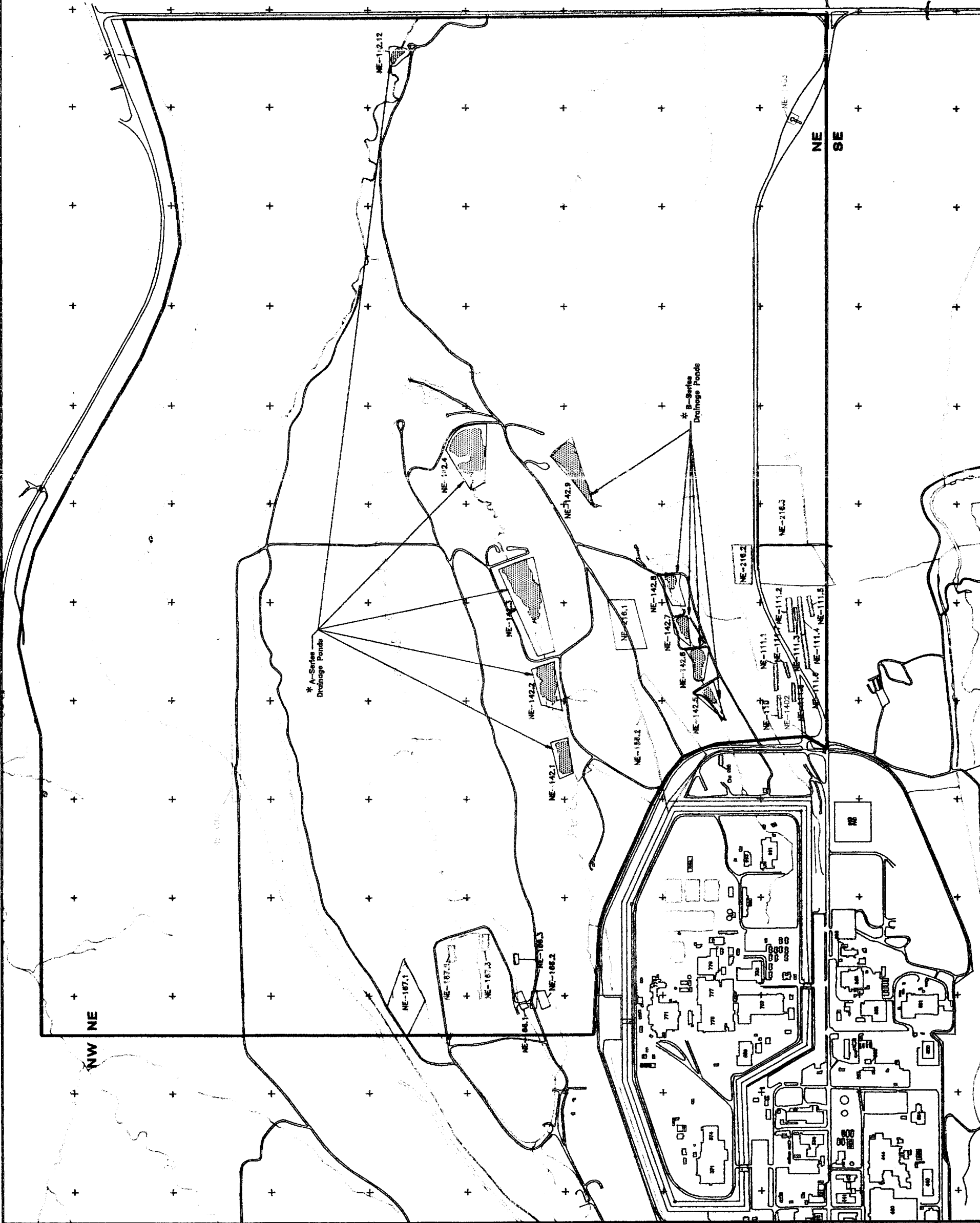
ACRONYMS

HASP	Health and Safety Plan	HWA	Hazardous Waste Area
PPE	Personal Protective Equipment	RWP	Radiation Work Permit

REFERENCE: DRAWING PROVIDED BY DOTY & ASSOCIATES, FIGURE NO. 3-1,
12/17/91, PROJECT NO. 506-10.



PREPARED FOR:		U.S. DEPARTMENT OF ENERGY	
		Rocky Flats Plant	
		Golden, Colorado	
		FIGURE 3-1	
TITLE:			
PAC AREA			
BOUNDARIES			
REVISED 5/22/92			
PROJ. NO.	304944	DWG. NO.	304944-B121
DESIGN BY	A. VIRGIL	CHECKED	AKS
DRAWN BY	A. VIRGIL	APPROVED	FJB
DATE	12/18/91	SCALE	AS SHOWN
			OF
			SHEET



LEGEND

- ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- NE-106.3
- CHANGES POTENTIAL HAZARDOUS SUBSTANCE SITE
- NE-116
- THE A AND B SERIES DRAINAGE PONDS AND DRAINAGES ARE CONSIDERED POTENTIAL AREAS OF CONCERN

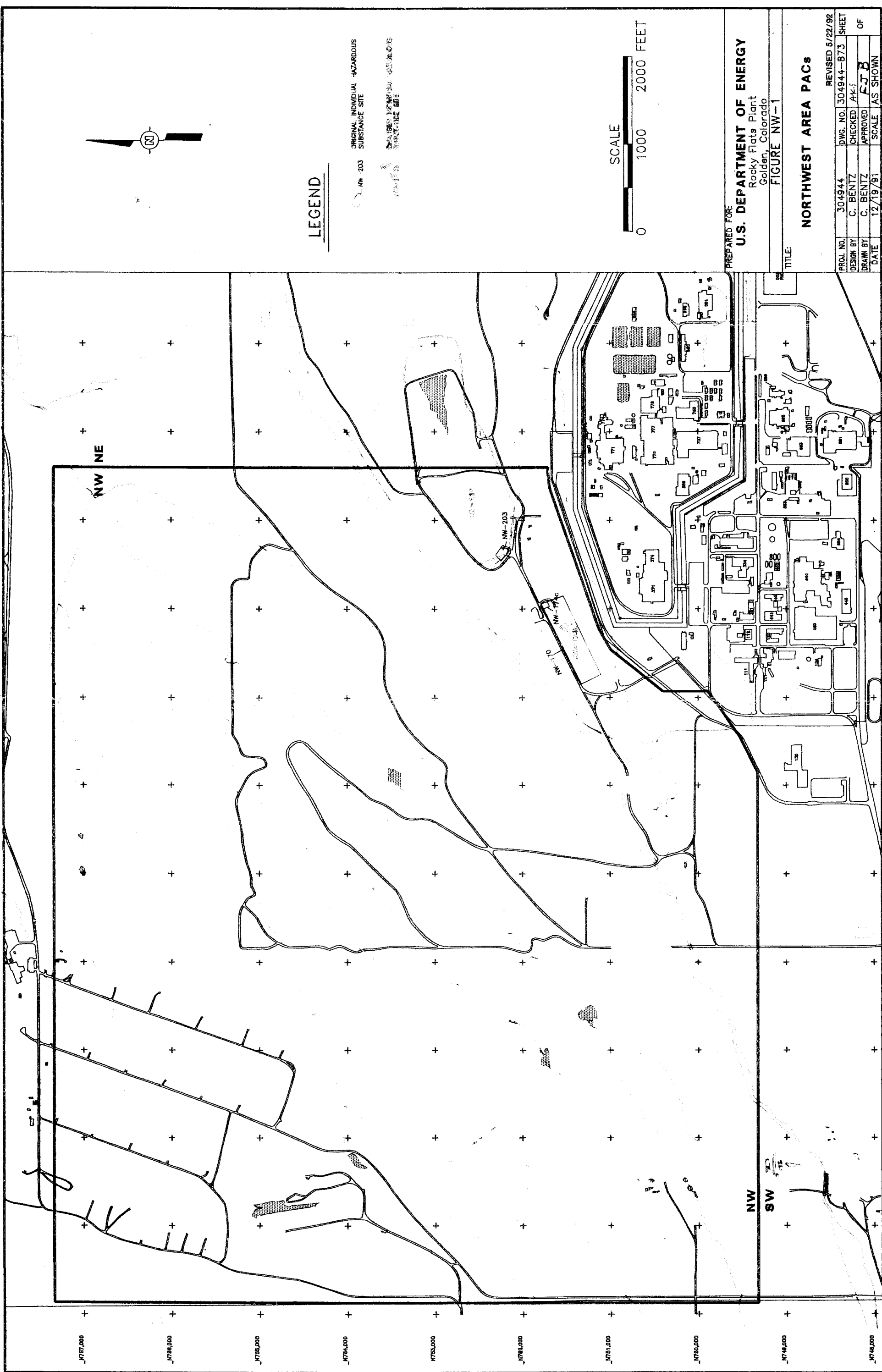


PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado
FIGURE NE-1

TITLE:
NORTHEAST AREA PACs

PROJ. NO.	DWG. NO.	CHECKED	APPROVED	DATE	SCALE
304944	304944-B74	C. BENTZ	C. BENTZ	12/19/91	AS SHOWN

REVISED 5/22/92
OF



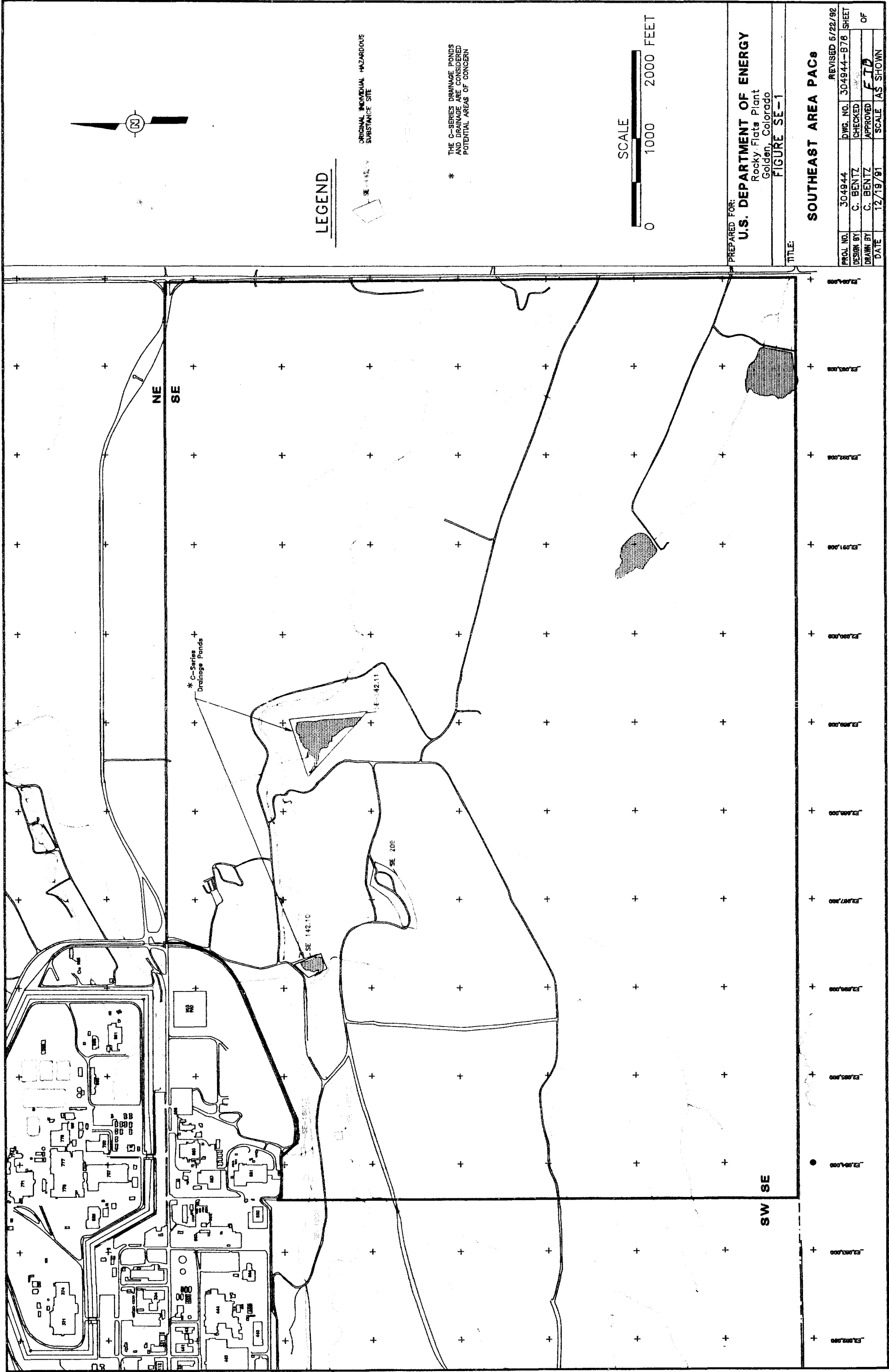
LEGEND

- ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- HAZARDOUS SUBSTANCE SITE

PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado
FIGURE NW-1

TITLE:
NORTHWEST AREA PACs

PROJ. NO.	DWG. NO.	REVISED	5/22/92
304944	304944-B73		
DESIGN BY	C. BENTZ	CHECKED	AKJ
DRAWN BY	C. BENTZ	APPROVED	FJB
DATE	12/19/91	SCALE	AS SHOWN



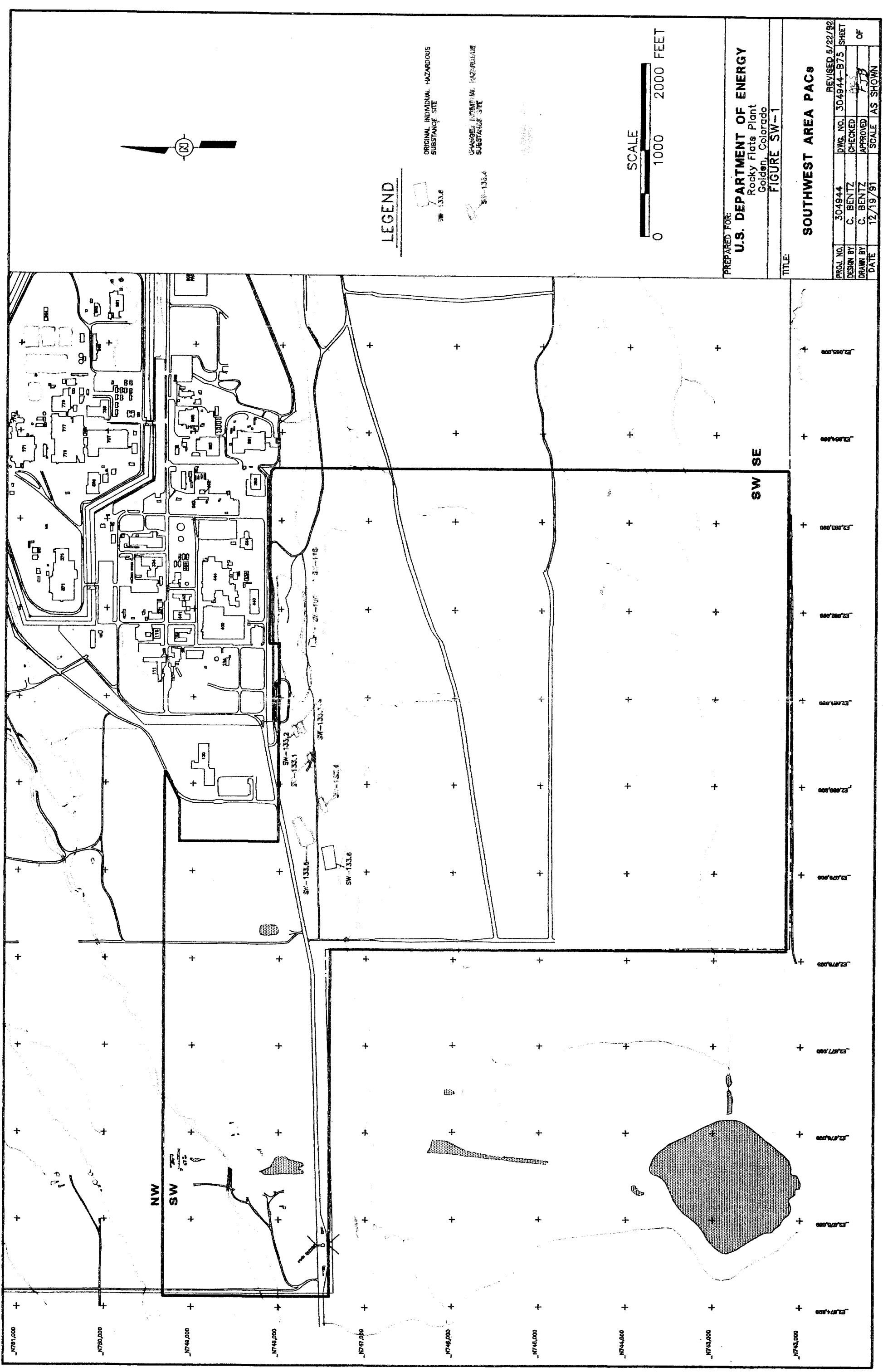
4944876 05/22/92 9:15am CAB

PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

TITLE:
FIGURE SE-1

SOUTHEAST AREA PACs

REVISED 5/22/92			
PROJ. NO.	DWG. NO.	CHECKED	BY
304944	304944-B78		
DESIGN BY	DATE	APPROVED	SCALE
C. BENTZ	12/19/91	<i>FTD</i>	AS SHOWN



MAP 125 continued